



GRAYLING AREA TRANSPORTATION STUDY

Northeast Michigan Council of Governments

FEBRUARY 2022



EXIT 254



DOWNTOWN
Grayling



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01

Introduction

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INTRODUCTION

The Grayling Area Transportation Study is a holistic analysis of the transportation conditions in the Grayling Area with the goal of identifying specific portions of the transportation system that are in need of upgrades and improvements. This study is an update to the previous study completed in 2008, which included recommendations for interstate interchange upgrades, roadway capacity improvements, and new access routes through the Study Area. Due to the changes in local transportation priorities, federal and state funding levels, growth at local major employers, and traveler needs, an update to the Study is needed. There is now a greater emphasis placed on new technology, accommodating multi-modal transportation options, improving safety conditions, and addressing capacity deficiencies with efficient design solutions.

Through the Grayling Area Transportation Study, the issues related to the current and future demands of the transportation system will be addressed. Safety, efficiency, convenience, and economic well-being of the traveling public will be considered in all project recommendations. The purpose is to find mobility solutions that build on the previous planning and design work, are feasible to implement, and are right-sized to the community.

The Project Study Area (Figure 1) is located mostly in Crawford County with a small portion in Roscommon County. It is centered on the City of Grayling, but extends into the surrounding Townships including, Grayling Township, Frederic Township, Maple Forest Township, and Beaver Creek Township. In Roscommon County, Gerrish Township and Lyon Township are also partly in the Study Area at the south end.

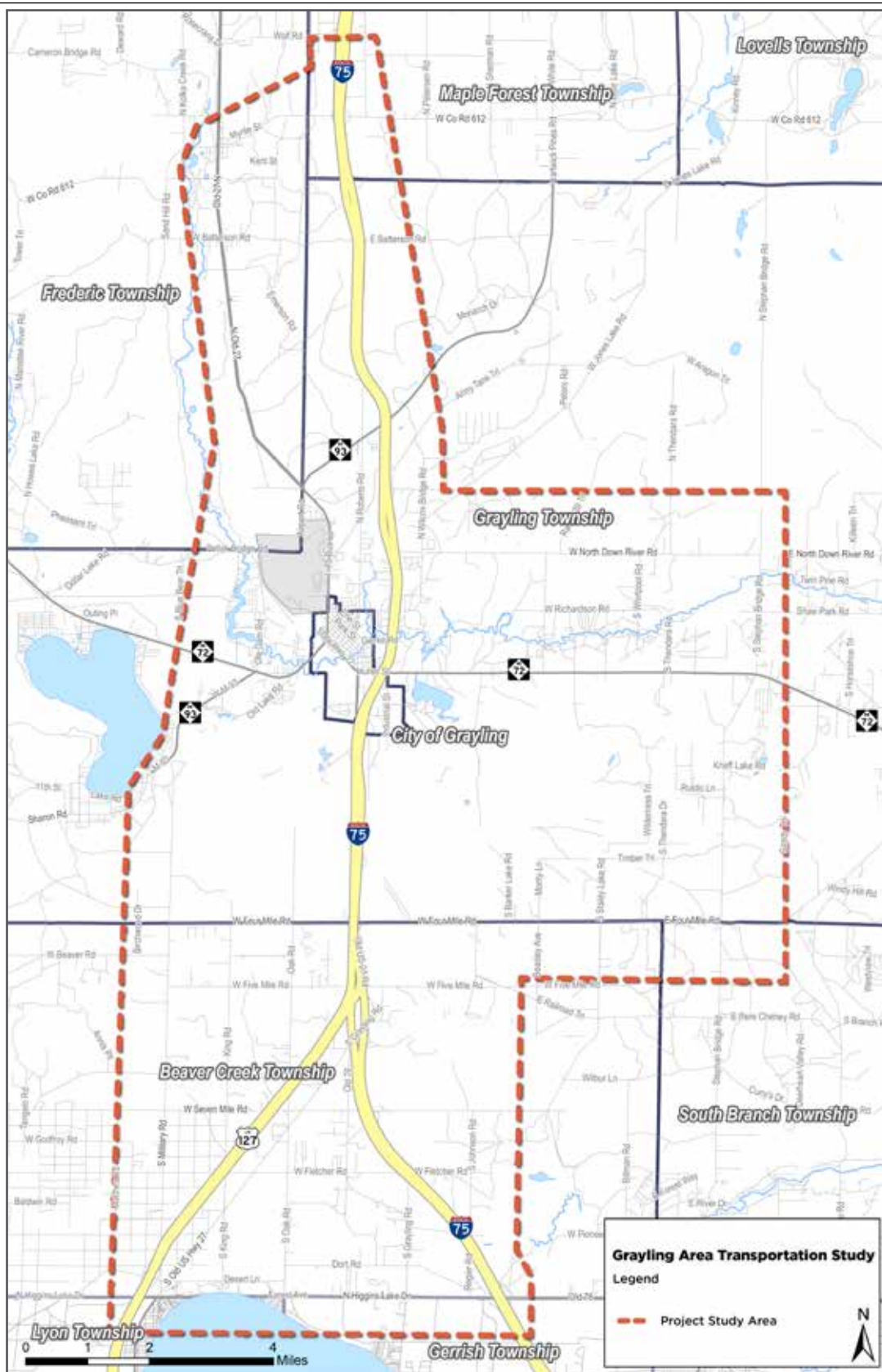


FIGURE 1: Grayling Area Transportation Study Area

Introduction

The Study Area includes a number of large employers and activity centers, including Camp Grayling, the Maneuver Area Training Equipment Site (MATES), Kirkland College, Arauco, Weyerhaeuser, Downtown Grayling, and Grayling Hospital. The Grayling Area has become a hub of outdoor activity throughout the year and a tourist destination for visitors from around the State. The AuSable River, Hartwick Pines State Forest, Hanson Hills Recreation Area, and the myriad of off-road vehicle (ORV) trails in the area offer a variety of recreation activities for a many different interests.

The Grayling Area Transportation Study was a year-long project that has been broken into four phases (see Figure 2 below.). The first, and longest phase, of the project is the Discovery Phase, which includes the existing conditions analysis, traffic data collection, and existing traffic service analysis. The data collected and analyzed in this phase will inform the development of alternatives in future phases. Phase 2 is dedicated to estimating the future transportation needs based on recent growth patterns. During Phase 3, potential transportation improvements will be developed that will address the current and future needs in the Study

Area. Finally, the recommendations will be refined and finalized based on input from the community and project Advisory Committee. A project implementation plan will lay out the order of projects based on need to the community.

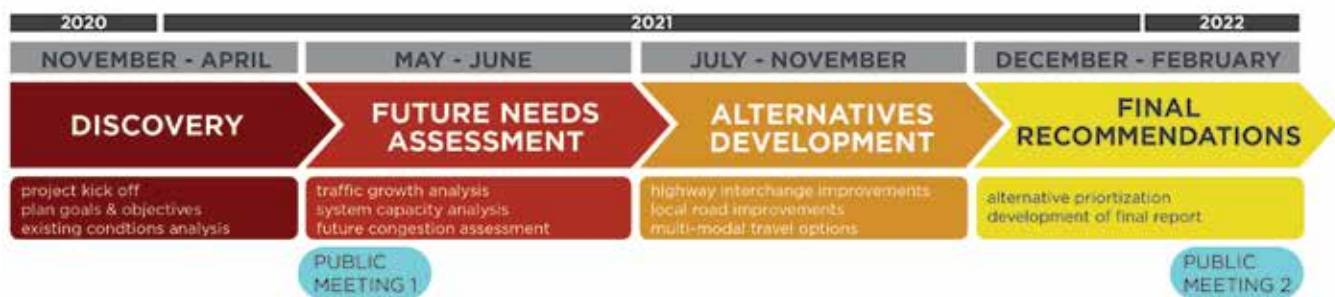


FIGURE 2: Project Process



Camp Grayling is one of the largest employers in the region and representatives from the Base were included on the project Advisory Committee.





02

Public Engagement

02

PUBLIC ENGAGEMENT

A critical component to every planning study, community engagement was performed throughout the Study process. Gathering input from the community is essential to understanding what the specific issues the region is experiencing and where opportunities for improvement may be located. The community's input is also important to determining preferences for new transportation projects in the area, including non-motorized transportation, off-road vehicle trails, parking, and access management. Public engagement for the Grayling Area Transportation Study consisted of regular meetings with the project Advisory Committee and two formal public meetings.

Advisory Committee

The project Advisory Committee for the project consisted of local leaders from Grayling, Crawford County, MDOT, and the other communities in the Study Area. The Advisory Committee was instrumental in determining the goals for the project, reviewing the project recommendations, and distributing information to the community. The Advisory Committee was also responsible for ensuring that the project meet the needs of the community and local institutions. The members of the Advisory Committee were selected by NEMCOG staff and consist of staff members from the plan's stakeholders.

- Stephan Lacy – Grayling Township
- Donald Babcock – Crawford County Road Commission
- Kim VanNuck – Beaver Creek Township
- Joe Merchant – Crawford County Economic Development
- Carey Jansen – Crawford County
- Erich Podjaske – City of Grayling
- Dustin Sinkes – Camp Grayling
- Brian Burrell – Camp Grayling
- Jason Galitas – MDOT

Meetings with the project Advisory Committee were held on the following days via online conference software:

- November 5th, 2020
- December 16th, 2020
- April 7th, 2021
- August 5th, 2021

Public Meetings

Two public meetings were held as part of the Grayling Area Transportation Plan. Due to COVID-19 and an attempt to keep members of the public and project team safe, the first public meeting was held via Zoom. The meeting invitation was distributed to the community by members of the Advisory Committee and posted to the project website. Additionally, the meeting was recorded and posted to the project website after to ensure those members of the community who were unable to attend could view the progress made.

Public Meeting 1

In May of 2021, the first public meeting was held via Zoom online conference software. The meeting started with a presentation summarizing the existing conditions analysis that had been completed. 15 participants joined live and were able to see a high-level view of the demographic and transportation conditions that are impacting the roadway network in the Grayling Area.

Following the presentation, a discussion session was held with the goal of learning more about the issues residents experience on a day to day basis and what they would like to see the transportation system look like in the future. Many of the comments from attendees were similar to the insight gathered from the project Advisory Committee and included the following:

- Transportation investments should be made to add full interchanges at N. Down River Rd and I-75 BL, improvements to the 4 Mile Rd interchange and overpass, and Military Rd improvements.
- Non-motorized improvements should be made to connect to new senior centers, along M-72, and supporting the Iron Belle Trail.
- Opportunities within DNR and MDOT right-of-way may exist for new trails.

- Areas where residents feel there are transportation safety issues include:
 - » Crossing at Grayling City Park
 - » Intersection of M-72 and M-93
 - » N. Down River Rd overpass as a bicyclist or pedestrian
 - » Entrance onto bike trail at N Down River Rd and I-75 BL
 - » Crossing in front of St. Mary's Church at Lake St and Peninsular St

The meeting was recorded and the recording was posted to the NEMCOG project website following so that other community members could view the presentation. Residents were also directed to the community survey (results shown below).

Public Meeting 2 Summary

On February 17th, 2022, the second and final public meeting for the Grayling Area Transportation Study was held at Grayling City Hall. The meeting was a joint in-person and virtual meeting where participants could attend in person or log into a Zoom call of the presentation. The meeting consisted of a presentation of the Study's findings and project recommendations, followed by an open house style meeting where meeting attendees could view project boards in greater detail. In total, 15 attendees joined the meeting either in person or via Zoom.

Overall, the reception to the project recommendations were positive. Comments heard from community members were centered around improvements for pedestrians, specifically in the City of Grayling. A major concern is the potential difficulty of crossing the street as a pedestrian at the recommended roundabouts. The meeting participants were excited to see the connection of transportation improvements to economic development in the Grayling area.

Public Survey

Additionally, an online public survey was created and distributed to the community. This survey allowed community members to submit feedback and ideas on where the transportation needs in the community are located. The survey questions focused on how residents travel around the Grayling Area and what issues they see on a daily basis. 3/4 of respondents live in the City of Grayling or Grayling Township.

Nearly all respondents travel through the Study Area using a car, however some also walk, bike and take transit through the community. An even number of respondents either live in the Study Area, live and work in the Study Area, or travel through frequently. Additionally, most people are traveling to either the City of Grayling or Downtown Grayling on a daily basis.

60% of respondents said they typically experience traffic congestion in Grayling. Traffic hot spots included M-72 at Ingham Street where the roadway narrows, in downtown Grayling, at the intersection of M-72

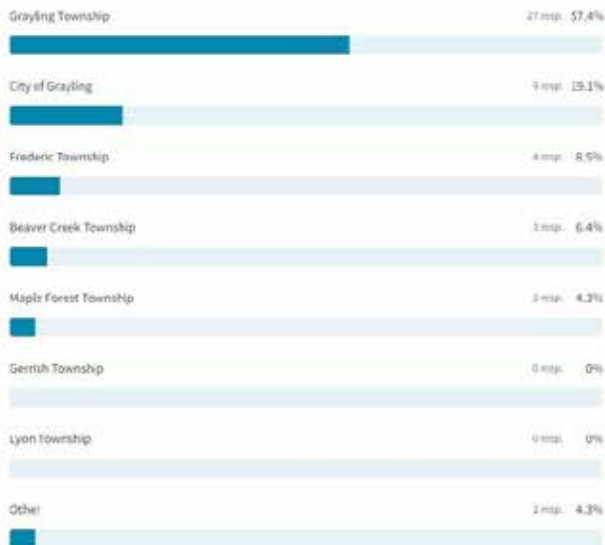
and Cedar Street, along I-75 Business Loop, and at the intersection of E. Michigan Avenue and N Down River Road. The most unsafe areas for respondents was the center of Downtown Grayling.

Most respondents use I-75 to get around the Grayling area and experience a number of challenges when using the interstate, including entering and exiting the highway, traffic congestion, difficulty navigating.

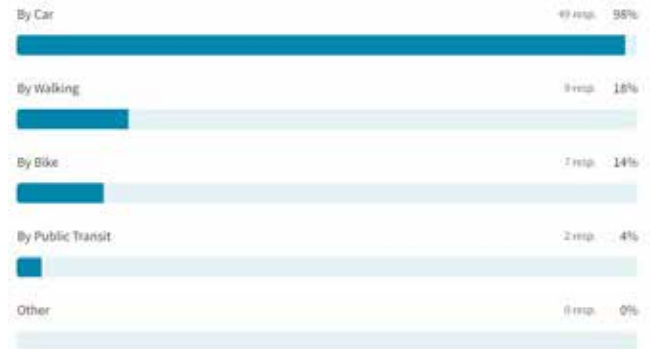
Respondents were asked about their interest in walking and biking around Grayling more often. Results with split with about half wanting to walk and bike more often. Most respondents were not interested in taking public transit more often.

Finally, residents were asked about what would bring them to Downtown Grayling more often. The biggest response was for more businesses and amenities, followed by less traffic congestion and more parking. About 25% of respondents said that more walking and biking options and safer street crossings would encourage them to come Downtown more.

In Which Community Do You Live?



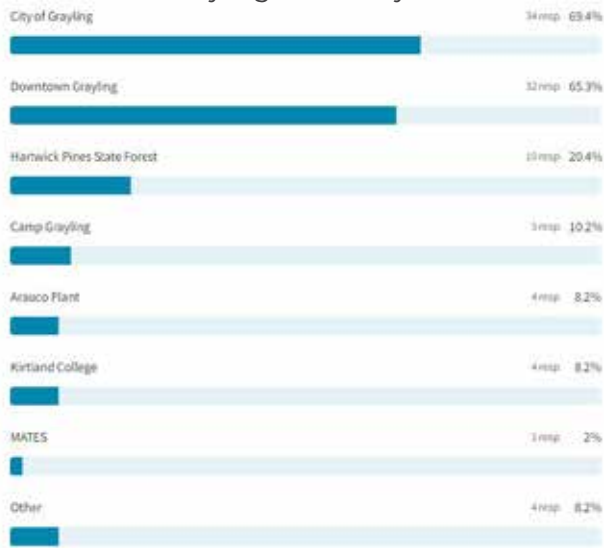
How do you travel around the Grayling Area?



Do you live or work in the Study Area?



Where in the Grayling Area do you travel?



Do you typically experience traffic congestion in the Grayling Area?



Do you typically use I-75 to travel around the Grayling Area?



What challenges do you experience when using I-75?



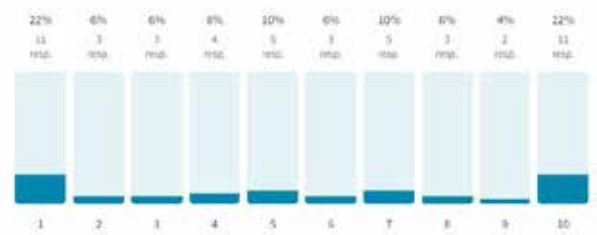
On a scale of 1-10, how interested are you in biking more around the Grayling Area?

4.8 Average rating



On a scale of 1-10, how interested are you in walking more around the Grayling Area?

5.4 Average rating

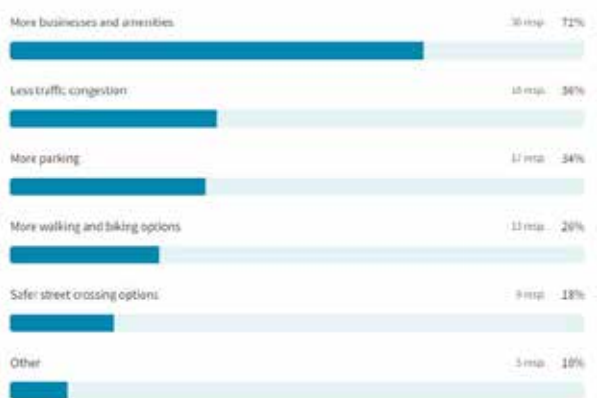


On a scale of 1-10, how interested are you in taking transit more around the Grayling Area?

3.1 Average rating



What would encourage you to come to Downtown Grayling more often?







03

Existing Conditions

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EXISTING CONDITIONS

Transportation systems are inherently affected by the surrounding population, employment, and land use. This section explores the historic, existing, and potential future demographic, land use, and transportation data for the Study Area. Data from the US Census Bureau, MDOT, NEMCOG, and the Study Area communities were collected, compiled, and analyzed for this section.

DEMOGRAPHICS

Population and Employment

A review of the existing and past population and employment trends was completed to better understand the demands placed on the transportation network. Changes in population since the last Grayling Area Transportation Study were compiled and analyzed to determine the differences between the expected traffic levels and the actual levels.

Population changes over the last 18 years were studied to better understand how each community in the Study Area has changed. More importantly, the change in population from 2010 to 2020 gives a sense of how the area has changed since the previous Transportation Study. In most cases, the communities within the Study Area have decreased slightly in population since 2010. Grayling Township, Frederic Township, and Maple Forest Townships have increased slightly. Most of the decreases were very minor, between 0.51% and 2.68%. Lyon Township, however, saw a 10.1% decrease, potentially due to changes in full time residence of property owners in the Township. Most of the homes sit on Higgins Lake and may be vacation homes. Overall, the total change in the Study Area communities was just over -1.3%. Table 1 shows the change in population for the two counties and the individual communities within the Study Area.

TABLE 1: Study Area Population

Study Area Communities	2000	2010	2020	Change (2010 – 2020)
Grayling	1,952	1,917	1,867	-2.68%
Grayling Township	6,516	5,826	5,827	0.02%
Frederic Township	1,431	1,344	1,385	2.96%
Maple Forest Township	498	652	653	0.15%
Beaver Creek Township	1,495	1,730	1,721	-0.52%
Gerrish Township	3,084	2,994	2,930	-2.15%
Lyon Township	1,351	1,370	1,150	-10.13%
Total	16,327	15,833	15,457	-1.31%

Since the majority of the Study Area is located in Crawford County, it is important to consider the overall population trend here as part of the Grayling Area Transportation Study. Between 2011 and 2019, the population in Crawford County has fluctuated between a high of around 14,325 people to a low of 13,820. Since 2017, the county has begun to add additional residents and is now back to 2015 levels. This loss in population since the Great Recession is common for most cities around Michigan and the State itself. Figure 3 shows the change in population in Crawford County from 2010 to 2019.

Overall, the population trend in the Study Area has decreased since the previous Transportation Study. However, the population appears to be stabilizing, perhaps even reversing. It is too early however, with the data available, to determine how far the population will rebound in the Study Area. The increase in population in Crawford County over the past three years is relatively small (less than 80 people total).

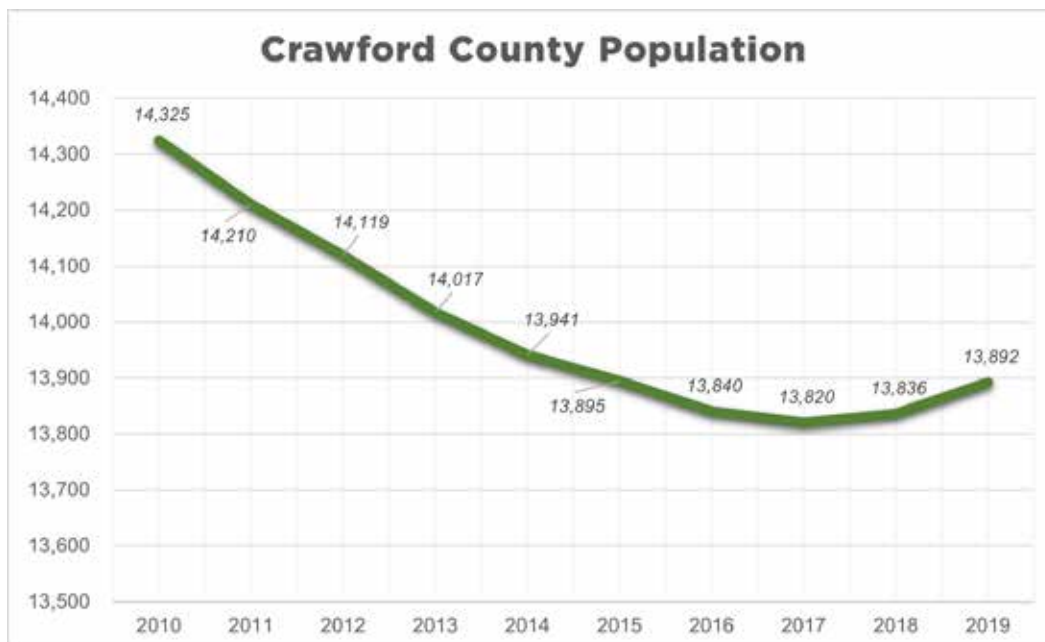


FIGURE 3: Crawford County Population (2010-2019)

Employment

Employment information for the Study Area was compiled using data from the US Census Bureau, specifically the Longitudinal Employer Household Dynamics tool. This tool allows for users to see where job clusters are located in a specific area. This data includes all private jobs but does not include government employment which is why Camp Grayling, MATES, and the Grayling Army Airfield do not show up in this analysis. About 200 employees work between these three locations.

Figure 4 and Figure 5 show the location of private employment in the project Study Area. Overall, the majority of employment in Crawford County is located in the City of Grayling. Large employment areas include Grayling Hospital, Downtown Grayling, and

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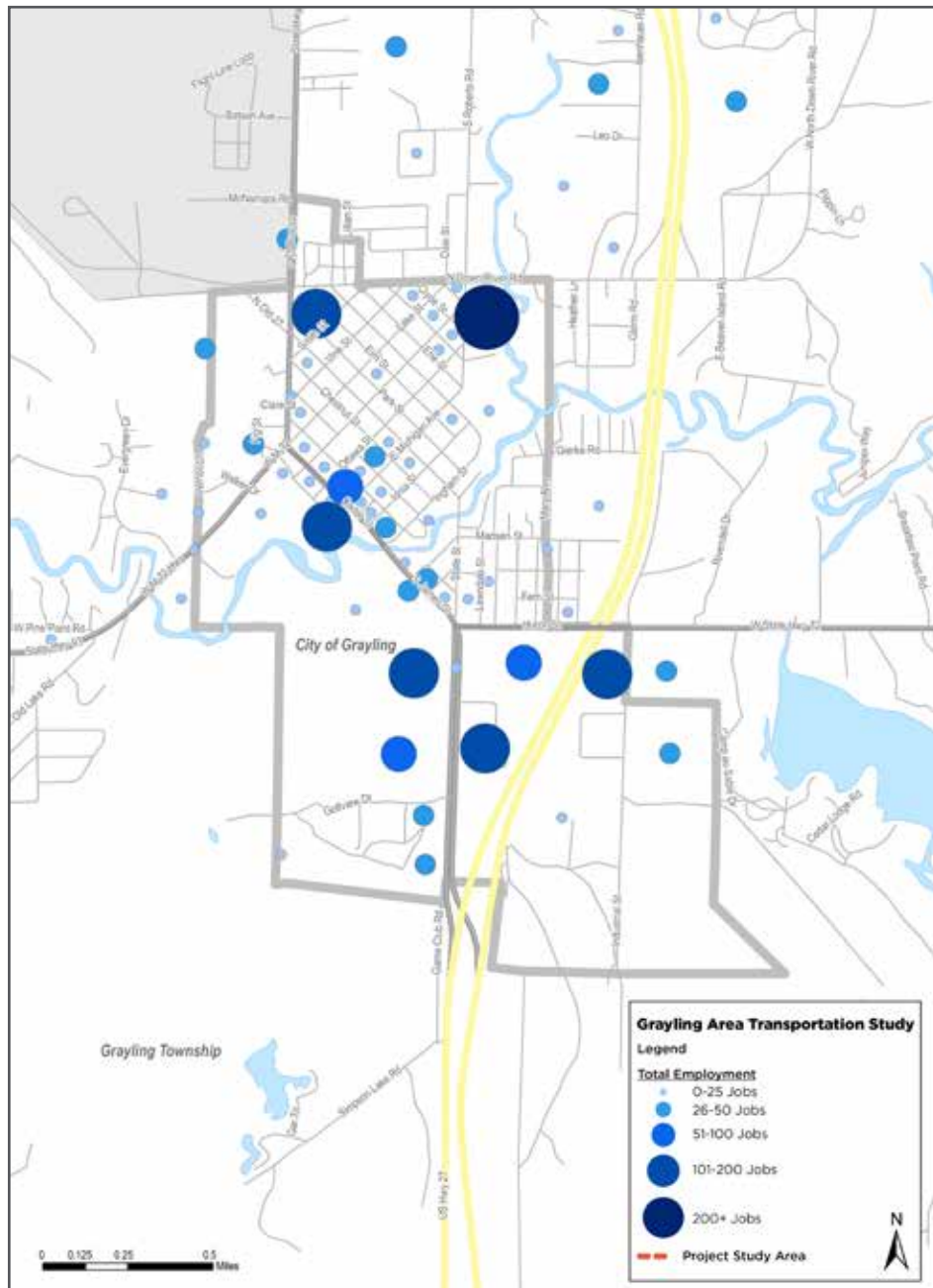


FIGURE 4: City of Grayling Employment Centers

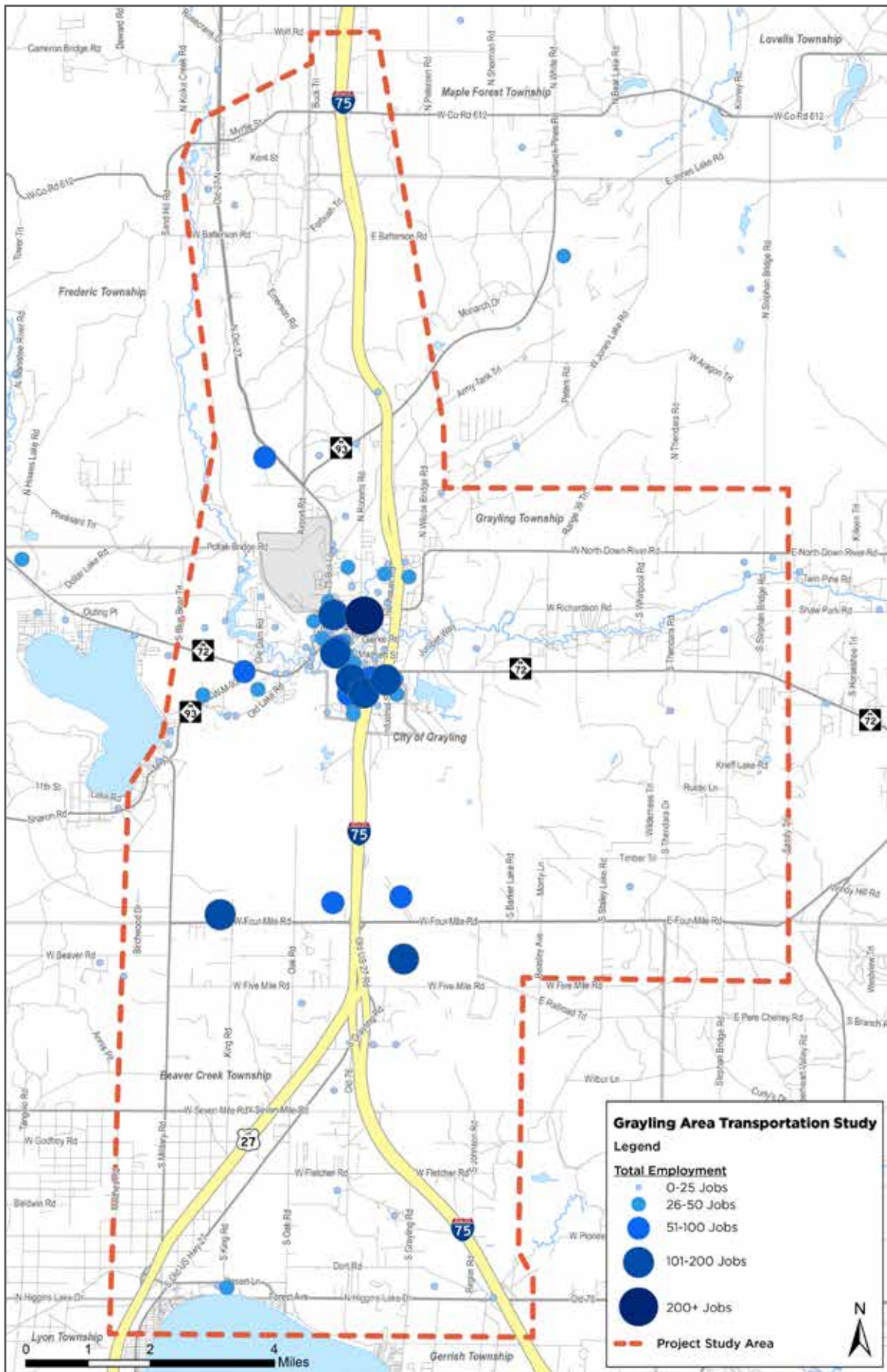


FIGURE 5: Grayling Area Employment Centers

Existing Conditions

the retail area along I-75 Business Loop on the south side of town. Some other large employment areas are along 4 Mile Road and include Kirtland College and a few heavy industry companies.

Since the previous Grayling Area Transportation Study, employment has changed in the Grayling Area. The most drastic change has been in the Healthcare and Social Assistance section with an increase of nearly 800 jobs between 2008 and 2018. This represents an increase of over 360%. The County has also seen increases in Accommodation and Food Service, Public Administration, and Construction jobs. Decreases in Manufacturing, Retail Trade, and Educational Services mirror the changes to jobs in region. Overall,

employment in the County has grown by 28% since the previous Study and now has over 4,200 total jobs. Table 2 shows the employment totals in 2008, 2018, and the 10 year percent change.

TABLE 2: Top Employment Sectors in Grayling Area (2008 and 2018)

Employment Sector	Total Jobs (2008)	Total Jobs (2018)	Percent Change
Health Care and Social Assistance	232	1,076	364%
Accommodation and Food Services	455	593	30%
Manufacturing	814	512	-37%
Public Administration	349	511	46%
Retail Trade	454	418	-8%
Construction	175	205	17%
Educational Services	264	191	-28%
All Other	548	699	22%
Total	3,291	4,205	28%

TABLE 3: Study Area Commute Mode (2018)

Community	Drove Alone		Carpool		Public Transit	
	Total	% of All Commuters	Total	% of All Commuters	Total	% of All Commuters
Grayling	476	84.5%	77	13.7%	10	1.8%
Grayling Twp	1,946	87.1%	282	1.6%	5	0.2%
Frederic Twp	326	85.8%	54	14.2%	0	0.0%
Maple Forest Twp	247	92.9%	16	6.0%	3	1.1%
Beaver Creek Twp	472	82.4%	97	16.9%	4	0.7%
Gerrish Twp	878	96.4%	33	3.6%	0	0.0%
Lyon Twp	314	86.5%	49	13.5%	0	0.0%

Journey to Work

Another important metric in determining the demands of the transportation system is the number of commuters present in a community. Using data from the US Census Bureau, an understanding of how residents in the Study Area communities travel to work was developed. These data are valuable in determine where residents are traveling from and how far they are traveling each day for work.

Table 3 above shows the breakdown of how residents in each Study Area community travel to work. As expected, and consistent with much of the State of Michigan, the majority of commuters in the Study Area drive alone to work. Beaver Creek Township, the City of Grayling and Frederic Township have the lowest proportion of commuters that drive alone to work. These communities also have higher percentages of carpoolers and transit users as well.

Table 4 below shows the average travel time to work for commuters in each community within the Study Area. Consistent with the employment data shown above, the areas nearest to the City of Grayling have the shortest average commute. Over 70% of commuters in Grayling have a travel time to work of under 20 minutes. About 65% of residents who live in Grayling Township travel less than 20 minutes to work. The communities farther away from the core of the Study area tend to have longer commute times. However, the majority of residents in all of the communities in the Study Area have a commute of 30 minutes or less.

TABLE 4: Travel Time to Work (2018)

	Under 10 Minutes	10-20 Minutes	21-30 Minutes	30-45 Minutes	40-60 Minutes	60+ Minutes
Grayling	45%	26%	16%	10%	1%	3%
Grayling Twp	29%	38%	10%	14%	6%	5%
Frederic Twp	9%	26%	25%	23%	4%	13%
Maple Forest Twp	1%	29%	36%	19%	10%	6%
Beaver Creek Twp	17%	47%	15%	9%	3%	9%
Gerrish Twp	17%	27%	34%	11%	2%	9%
Lyon Twp	14%	25%	35%	14%	5%	8%

Land Use

Land use in the study area consists primarily of State-owned forest land and other natural land (non-forest, wetland, and agricultural) surrounding residential, industrial, and commercial land uses. Outside of normal employment commuting, most of the additional traffic in the Study Area comes from tourists looking to access these natural recreational amenities or for those traveling to other surrounding natural features. The center of the Study Area is home to the City of Grayling which contains the least amount of natural land of the communities. Much of Grayling is comprised of residential, commercial, institutional, and industrial property. Surrounding the City of Grayling are Camp Grayling and the associated military facilities - Grayling Army Air Field (AAF) and the Maneuver Area Training Equipment Site (MATES). Recently the AAF was expanded to allow for greater capacity. Additionally, Camp Grayling has seen increased activity and supplies many of the jobs and associated economic activity for the Grayling Area.

Much of the Study Area is characterized by a low-density development pattern typical of communities in Northern Michigan. Outside of the City of Grayling, residential areas are located near each other and away from more intense industrial or commercial land uses. Grayling Township is the largest community in the Study Area by population and has the most land utilized by residential land uses. Throughout all of the Study Area townships, residential areas are located near the major roadways, including M-93, M-72, Old 27 N, 4 Mile Rd, and Billman Rd.

The City of Grayling maintains a much more urban character than the surrounding townships. Residential areas are denser, and roadways are located closer together. Much of this is due to the original development of the City before the widespread use of automobiles in the late 1800s. Commercial areas and other activity centers needed to be walkable from area homes in order for commerce to happen. The historic street grid and downtown commercial area are

still being used and provide a unique character to the region. Outside of the Downtown Core of Grayling is a more modern commercial district along I-75 BL. Commercial areas outside of the City of Grayling are more sporadic and are focused on servicing local needs.

Land use in the study area is largely dictated by the presence of large tracts of State and Federally owned forest land, including Hartwick Pines State Forest and the Mason Tract. These public lands take up much of the landscape and are attractive to residents and visitors alike. Since publicly owned lands are rarely sold for private development, it is likely that this land use pattern will remain for the foreseeable future. However, with the increased popularity of outdoor activities, the region may benefit from increased tourism.

Land use for the seven municipalities within the Study Area are shown in Figure 6 below.

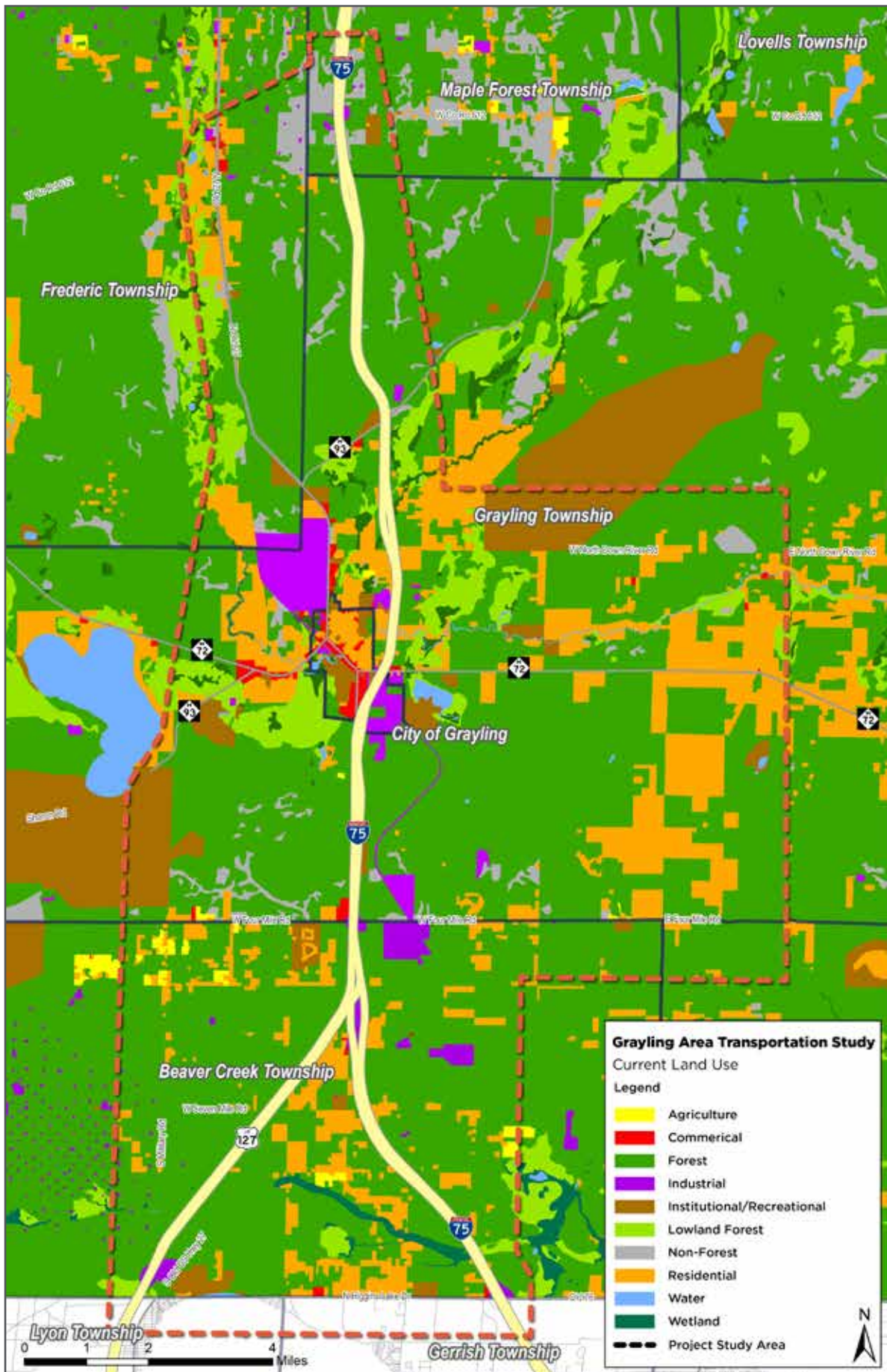


FIGURE 6: Study Area Land Use

Existing Conditions

The Study Area also includes some major activity centers and traffic generators that contribute to the demand on the transportation system. As expected, many of these activity centers are located within the City of Grayling, however others are distributed around the Study Area. Below is a list of some of the major traffic generators in the region:

- Camp Grayling
- Grayling Army Air Field
- MATES
- Grayling Hospital
- Downtown Grayling
- Hanson Hills Recreation Area
- Kirtland Community College
- N Higgins Lake State Park
- Hartwick Pines State Forest
- Lake Margrethe
- AuSable River Campgrounds and Canoe Rentals
- I-75 BL Commercial District
- Grayling High School and Middle School

Figure 7 shows the location of major activity centers in the Study Area.

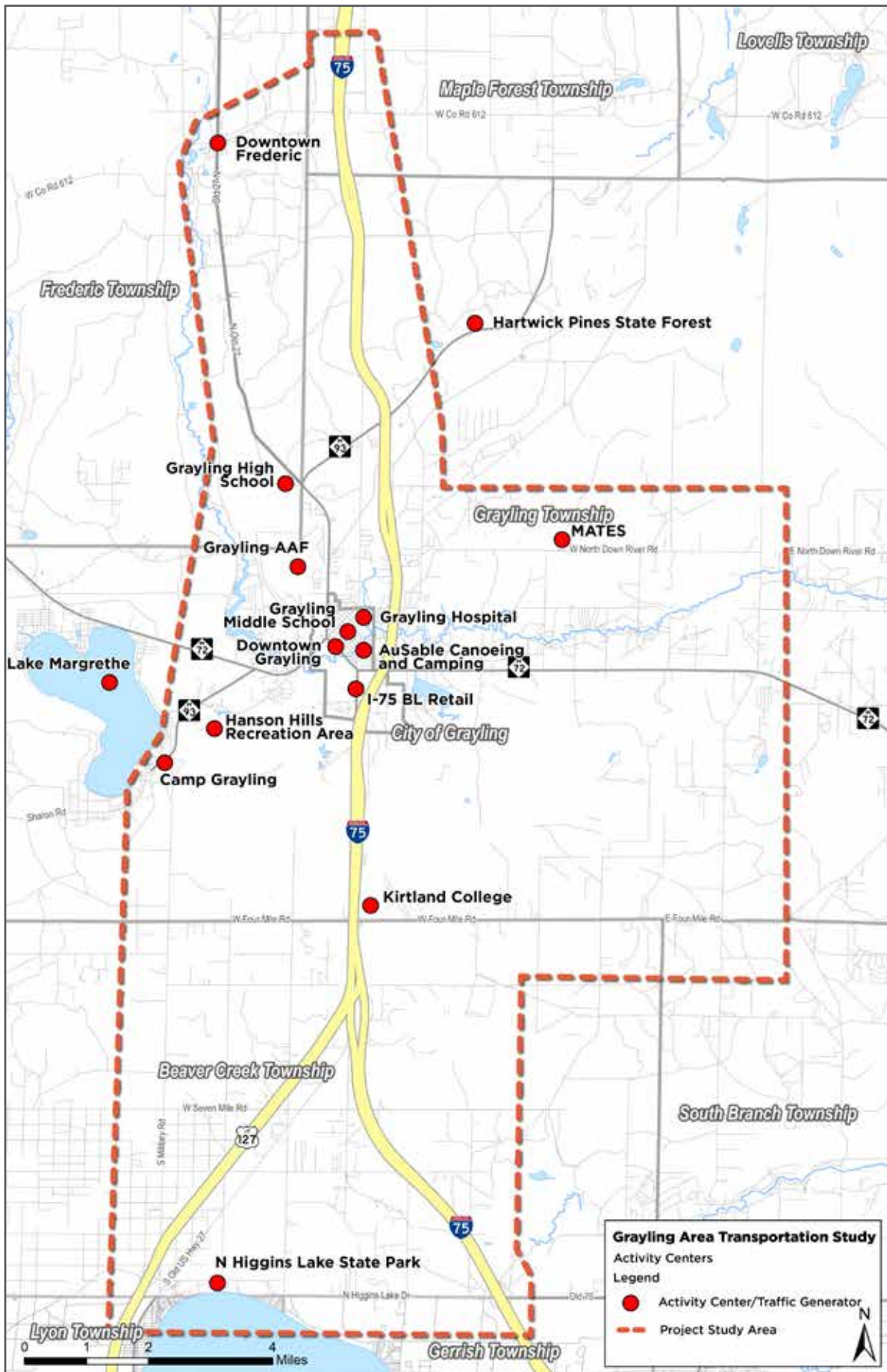


FIGURE 7: Study Area Activity Centers

TRANSPORTATION

The existing transportation network in the Study Area is comprised of a variety of roadway types, bicycle paths, sidewalks, and on-demand public transit service. A system of federal, state, and local roads provide access to most of the Grayling Area and are used by a wide range of people.

Roadway Network

The roadway network in the Grayling Study Area consists of roads ranging from the interstate down to local, unpaved roads. The major roadway located in the Study Area is Interstate 75, which runs the length of the State and carries freight, commuters, and tourists to destinations farther north or down state. The following major roadways located in the Study Area are the backbone to the transportation system and carry the majority of the traffic through the region:

I-75: Consists generally of 4 lanes but expands to 5 lanes south of the City of Grayling. It runs the length of Michigan. The interstate passes directly through the Study Area and carries much of the tourist traffic to the area. The speed limit is 75 mph.

US-127: A 4 lane freeway that joins with I-75 south of the City of Grayling and continues south to Clare, Mt. Pleasant, and Lansing. The speed limit is 75 mph.

M-72: This state trunkline runs east to west directly through Downtown Grayling and through much of Grayling Township. M-72 extends west to Traverse City and east to Mio. East and west of the Study Area, M-72 has 2 lanes and is posted with a 55 mph speed limit. Starting at the western boundary of the Study Area, M-72 consists of 4 lanes and has a 45-mph speed limit. Within city limits, the speed limit drops first to 35 mph, then at the junction with I-75 BL (Cedar St / McClellan St) to 30 mph through the downtown. East of I-75, M-72 drops to 2 lanes and the speed limit resumes 55 mph.

M-93: A state trunkline route that links Camp Grayling on the west edge of the Study Area to Hartwick Pines State Park. This road runs north to south through the northern half of the Study Area and terminates at either end. M-93 starts at the entrance gate to Camp Grayling as a 2-lane road with a 55-mph posting, then turns and is co-located with M-72 into Grayling as a 4-lane road. At the junction with I-75BL ((Cedar St / McClellan St), it continues north co-located with I-75 BL (McClellan St) past the Grayling Army Air Field with 4 lanes posted 40 mph. Once outside the city limits the speed limit transitions to 55 mph. Starting at the intersection with Old 27 N, M-93 turns northeast, is a 2-lane road, crosses I-75 with a full access interchange, and terminates at Hartwick Pines State Park main gate.

I-75 Business Loop (BL): This is the Business Loop roadway that travels through Grayling and connects to I-75 north and south of the city. I-75 BL follows the alignment of the former US-27 and shares roadway with M-72 and M-93. It has a speed limit of 40 mph outside of the Downtown shopping district and 30 mph within Downtown. The interchange with I-75 south of town has only partial access, with an exit ramp from NB I-75 and an on-ramp to SB I-75. The interchange north of town is full access, with a diamond configuration.

County Road 612: A 2-lane County road with a 55-mph speed limit that travels east and west through the Study Area. The road crosses I-75 with a diamond configuration full access interchange and travels through central Frederic.

North Down River Rd: This is an east-west, 2-lane local road that starts at I-75 BL and continues east through the Study Area. N Down River Rd has a 55-mph speed limit outside of the City of Grayling. It has a half diamond interchange with I-75 and that provides partial access; a southbound exit ramp and northbound entrance ramp.

Four Mile Rd: An east-west, 2-lane road with a speed limit of 55 mph located between the City of Grayling and the split of I-75 and US-127.

Four Mile Rd has a full interchange with I-75 and is a highly utilized route for military vehicles accessing Camp Grayling. The Kirtland College campus is located off of Four Mile Rd.

Military Rd: A north-south, 2-lane local road with a 55-mph speed limit that provides direct access from the south to Camp Grayling. Military vehicles exiting I-75 at Four Mile Rd use Military Rd to reach Camp Grayling.

Old 27 N: This road is a north-south local road that begins north of the Grayling Army Air Field at the split with M-93. Old 27 N travels through Frederic Township and through Downtown Frederic, eventually traveling to Downtown Gaylord to the North. The speed limit is 55 mph for most of the road except in front of Grayling High School, where it is 25 mph.

N Higgins Lake Dr: An east-west local road that begins at the US-127 interchange, near Military Rd, and continues east to Downtown Roscommon. N Higgins Lake Dr also crosses I-75 and with a full interchange, allowing motorists to easily travel to US-127 from I-75. It has a speed limit of 55 mph and is located at the southern end of the project Study Area.



FIGURE 8: Study Area Major Roadways

Non-Motorized Network

Over the past 10 years, the State of Michigan has made great strides in adding non-motorized trails around the State. Walking and biking trails can now be found in most communities in Michigan and there are significant assets in Northern Michigan. The Iron Belle Trail, a statewide trail system extending from Detroit to the tip of the Upper Peninsula, travels directly through Grayling. The Grayling Area has an existing trail loop that connects Camp Grayling with Hartwick Pines State Forest through the City of Grayling. The portion of the existing trail that runs along McClellan Street is part of the Iron Belle Trail. Future planned portions of the Iron Belle Trail extend north and south along Old US 27. Additionally, a number of non-paved trails, foot trails, and snowmobile trails also are available in the Study Area. These are primarily seasonal and recreational and do not heavily interact with the vehicle transportation system.

NEMCOG has also identified a number of non-motorized pathways and trails through the region as part of their 2009 Non-Motorized Transportation Plan. The on-road trails identified for the Graying Area Transportation Study Area are along County Road 612, N Down River Road, M-72, Military Road, Old US 27 (south of CR 612) and Grayling Road. Off-road trails are planned for Old US 27 (north of CR 612), Old US 27 (south of Grayling), and N Higgins Lake Road.

In addition to the trails and pathways that currently exist in the Study Area, sidewalks are also present in a few distinct areas. The City of Grayling has a comprehensive sidewalk system that connects the Downtown and other commercial areas with the neighborhoods. Each neighborhood in Grayling is also complete with sidewalks on both sides of the street. Sidewalks do not extend into the industrial areas in Grayling, however. Sidewalks in Downtown Frederic are available as well. The remainder of the Study Area is without consistent sidewalks mostly due to the dispersed nature of the development pattern.

Public Transportation

Two different public transportation service providers operate in the Grayling Area Transportation Study Area: the Crawford County Transportation Authority (CCTA) and the Roscommon County Transportation Authority (RCTA). CCTA is a demand response, dial-a-ride service where customers will call ahead to schedule a ride. Within the City of Grayling and immediate surrounding area, on-demand rides can be scheduled at any time. Reservations must be made at least two hours in advance. Service is available to all residents but with different pricing depending on the group.

CCTA operates four general routes that start in Grayling and travel out to the less populated areas of the County. These routes have specific schedules and leave Grayling at set times throughout the day. Service to these areas may take longer to serve due to the scheduled departure times from Grayling. The routes are as follows:

- M-72 West - Past Lake Margrethe
- Frederic and Maple Forest Township – Including Downtown Frederic and Hartwick Pines State Forest
- M-72 East – Including Grayling Township and Lovells Township
- Beaver Creek and Roscommon – Serves the area south of 4 Mile Road in the County.

The Roscommon County Transit Authority is also a dial-a-ride service offering transportation services to Roscommon County residents and visitors six days a week. Service is provided anywhere in the County and there are no set routes. However, prospective riders must schedule rides in advance. Base fares range depending on the type of rider and are between \$.75 and \$3. For an additional fee, service can take riders outside of the County. Since the Study Area only extends a few miles into Roscommon County, it is likely that there are few transit trips being generated.

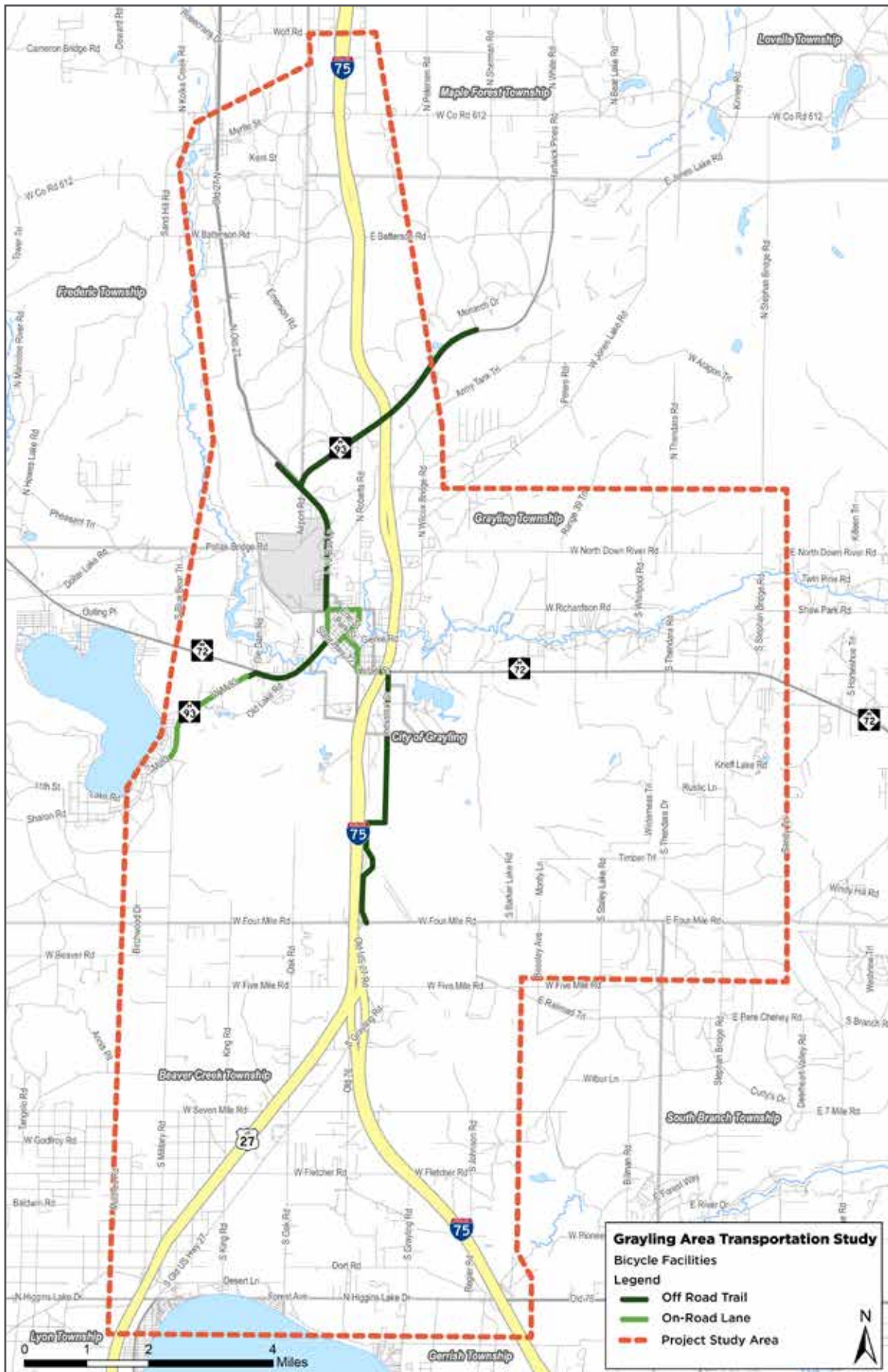


FIGURE 9: Non-Motorized Network

Trucking Corridors

All of the State highways in the Study Area are designated trucking corridors with no seasonal load restrictions, but have varying size restrictions. I-75, US-127, and M-72 allow trucks up to 8'6" wide.

These roads are part of the National Truck Network. Other state highways and roadways in the Study Area, including I-75 Business Loop and M-93, are open for year-round truck service with the same restrictions. These roadways are special designated highways that have state designations for trucks.

There are other corridors in the Study Area that are not designated trucking routes, but trucks may still need to use them to reach their final destination. Roadways adjacent to areas with Industrial, Commercial, Agricultural, or Institutional land uses typically see a higher volume of trucks due to the businesses that rely on large trucks for shipping, delivery, and transport of goods. Corridors that are not designated trucking routes but still see a higher-than-average volume of trucks include Four Mile Rd, S Military Rd, N Old 27, North Down River Rd, and Industrial St. Figure 6 shows the location of the National and State designated truck routes, as well as potential local truck routes that are not formally designated.

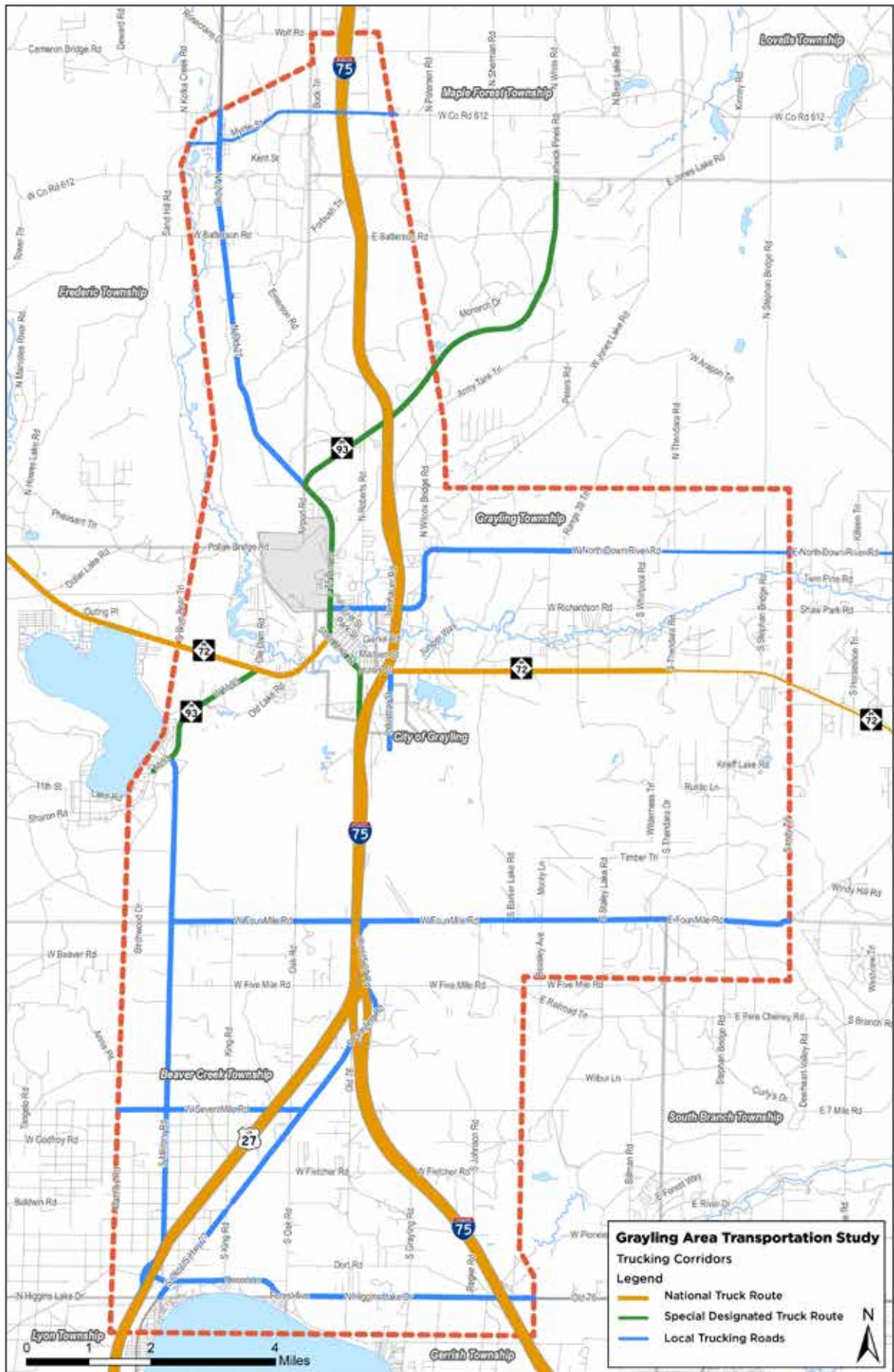


FIGURE 10: Designated and Undesignated Trucking Corridors

Existing Conditions

Crashes

Crashes are a major cause of incidental traffic congestion, in addition to the injuries and deaths, property damage, and related costs associated with them. 2,900 crashes occurred on roads within Crawford County between 2010 and 2019. This data excludes all vehicle-animal crashes as these are a result of weather, time of day, or other seasonal conditions that cannot be addressed in this Study. The proximity to large areas of natural land around residential and commercial areas in the County also contributes to this.

Within the project Study Area, 2,135 crashes were reported throughout the entire Study Area. However, the highest concentrations of crashes occurred along the

major roadways in the Study Area and within the City of Grayling. Major crash areas are located along the following roadways:

- I-75
- M-72
- M-93
- N Down River Road
- County Road 612
- I-75 BL
- N Higgins Lake Rd

TABLE 5: Study Area Crashes by Type (2010 - 2019)

	Study Area Crashes									Total For Study Area 2010 - 2019 (All Crash Types)
	Sideswipe	Head-On	Head-On Left Turn	Angle	Rear End	Single Vehicle	Overturn	Fixed Object	Other	
All Crashes	262	27	34	255	367	188	498	857	266	2,900
	9.0%	0.9%	1.2%	8.8%	12.7%	6.5%	17.2%	29.6%	9.2%	
Fatal / A Injury Crashes	0/4	0/3	0/2	0/6	0/7	1/9	5/48	7/56	1/2	143
	2.8%	2.1%	1.4%	4.2%	4.9%	7.0%	37.1%	39.2%	1.4%	

Of the 2,135 crashes in the Study Area that occurred between 2010 and 2019, the largest crash type is with a fixed object. Nearly 520 fixed object crashes occurred in the 9 years analyzed. These are crashes where a vehicle loses control and hits a tree, telephone pole, building, or other stationary object that is not another roadway user. The second most common crash type is overturn or roll-over crashes. Nearly 330 overturn crashes occurred. In analyzing crashes with other vehicles, the most common vehicle-to-vehicle crash is the Rear End (320 crashes), followed by Angle (230 crashes) and Sideswipe (206 crashes) crashes.

Of the 84 Fatal and Incapacitating Injuries caused by crashes, eight resulted in Fatalities. Four of the fatal crashes were located in Grayling Township, two in the City of Grayling, one in Beaver Creek Township, and one in Frederic Township. Three fatalities were Overturn crashes, three were crashes with a Fixed Object, one was categorized as a Miscellaneous Single Vehicle, and one was an angle crash. In most cases the reasoning for the crash and subsequent fatality was due to speeding, careless driving, or failing to stop at a traffic control device.

The annual crash distribution and severity in the study area can be seen in Table 6. The 2,135 crashes were relatively evenly distributed between 2010 and 2012 and between 2013 and 2019. A significant increase was observed in 2013, however there has not been a trend of increasing (or decreasing) frequency since then. Type A injuries are defined as any injury that prevents the injured person from walking, driving, or normally continuing the activities which he or she was capable of performing prior to the crash; examples include severe lacerations or visibly broken limbs. Many times, this level of injury require the person to be transported by ambulance to a hospital or critical care unit. Type B injuries are any injuries that are evident at the scene of the crash but do not prevent the individual from operating normally; examples include swelling on the head or abrasions. Injuries at this level are occasionally transported by ambulance. Type C injuries are any that are claimed but not visible; examples include complaints of pain or nausea.

TABLE 6: Study Area Crashes by Year and Type (2010 - 2019)

Year	Total Crashes	Crash Type			
		K-Fatal Injury	A-Incapacitating Injury	B-Non-incapacitating Injury	C-Possible Injury
2010	194	0	8	13	19
2011	170	0	10	14	16
2012	169	0	5	18	11
2013	221	3	5	9	22
2014	242	1	9	14	22
2015	204	0	6	6	13
2016	248	0	4	12	28
2017	207	1	6	7	11
2018	215	0	15	14	22
2019	265	2	9	15	21

Existing Conditions

As expected, most crashes in the Study Area occur along the major freeways in area, Interstate 75 and US 27. Three segments of I-75 in the Study Area have seen over 160 crashes between 2010 and 2019. These segments are from County Road 612 to Hartwick Pines Rd, from N Down River Rd to Four Mile Rd, and from Four Mile Rd to N Higgins Lake Rd. The highest density of crashes occurs within the City of Grayling, specifically on M-72/Cedar St in Downtown Grayling. I-75 BL between Huron St and I-75 and M-72 between Cedar St and M-93 are other high density crash areas. Table 7 shows the top 10 roadway segments by crash rate (crashes per mile per year) in the Study Area. Figure 11 shows the crashes between 2010 and 2019 in the Study Area.

TABLE 7: Crashes Rate along Major Roadways (2010 - 2019)

Road	From	To	Crashes	Crash Rate (Crashes/Mile/Year)
M-72	Ionia St	McClellan St	86	26.06
M-72	Huron St	Ionia St	75	20.27
I-75 BL	I-75	M-72 E	60	6.25
McClellan	M-72	N Down River Rd	27	5.87
Huron St	M-72/I-75 BL	I-75	23	5.75
M-72	McClellan St	Ole Dam Rd	77	5.66
N Down River Rd	McClellan St	Michigan Ave	26	5.20
I-75	Study Area Boundary	Co Rd 612	62	4.92
I-75	Co Rd 612	Hartwick Pines Rd	206	4.08
I-75	N Down River Rd	4 Mile Rd	210	4.08

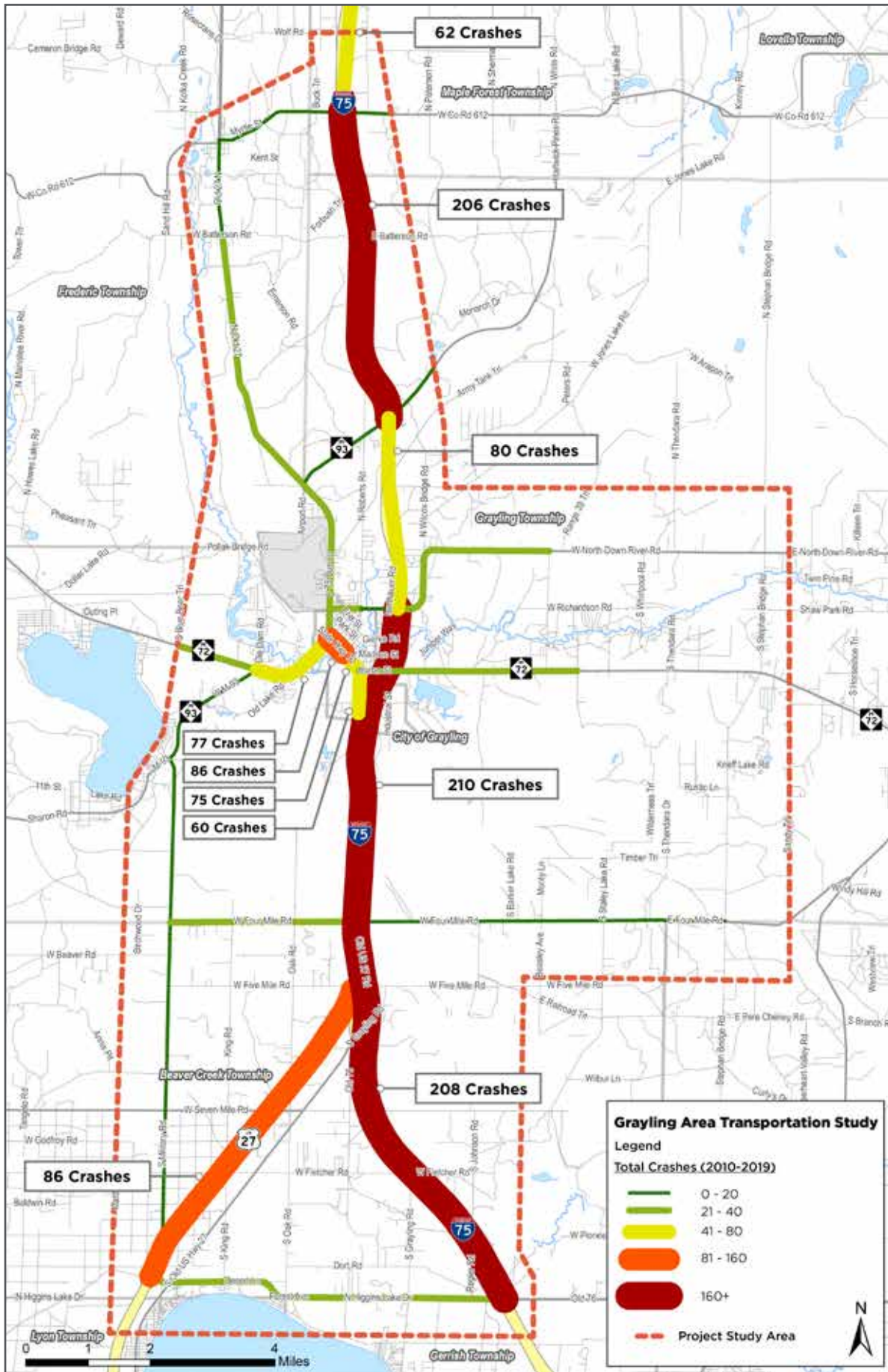


FIGURE 11: Total Crashes on Major Roadways (2010-2019)

Traffic Analysis

The Grayling Area Transportation Study is being completed during the 2020 and 2021 COVID-19 pandemic. As a result of the pandemic, traffic conditions throughout the State of Michigan are widely different than what they were in 2019, before the start of the pandemic. In order to limit the spread of the COVID-19 virus, many businesses are temporarily closed, employees are working from home, some schools are operating remotely, and, in general, people are staying home more often. All of these factors are leading to reduced traffic around the State and many roadways that were congested prior to 2020 are currently operating without much traffic.

Traffic counts in the project Study Area are outdated, however, and new counts at specific intersections are needed to determine which intersections and roadway segments may be in need of upgrades. In January 2021, new traffic counts were completed at most of the same intersections counted in the 2008 Transportation Study. These count locations are located in the areas with the greatest traffic and were vetted by the project Advisory Committee. Traffic count data at the following twenty-two (22) locations were collected as part of this study:

1. W County Rd 612 at I-75 on/off ramp
2. Hartwick Pines Rd at I-75 on/off ramp
3. N Old 27 at Hartwick Pines Rd
4. N Down River Rd at I-75 off ramp
5. McClellan St at N Down River Rd
6. McClellan St at Grayling Army Air Field entrance
7. Cedar St/M-93/McClellan St/Lake St Intersection
8. M-93 at Walker Dr
9. M-93 at Evergreen Dr
10. M-93 at W Pine Point Rd
11. M-93 at M-72
12. M-72 at S Blue Bear Trail

13. M-93 at S Military Rd
14. Cedar St at Michigan Ave
15. M-72 at State St
16. I-75 BL at Huron St
17. Huron St at Industrial St
18. W 4 Mile Rd at NB I-75 on/off ramp
19. W 4 Mile Rd at SB I-75 on/off ramp
20. W 4 Mile Rd at S Military Rd
21. N Higgins Lake Dr at US-127 SB on/off ramp
22. S Military Rd at N Higgins Lake Dr

Figure 12 shows the location of these intersections and roadway segments. Detailed analysis of the traffic counts at each location can be found in Section 4 on page 44.

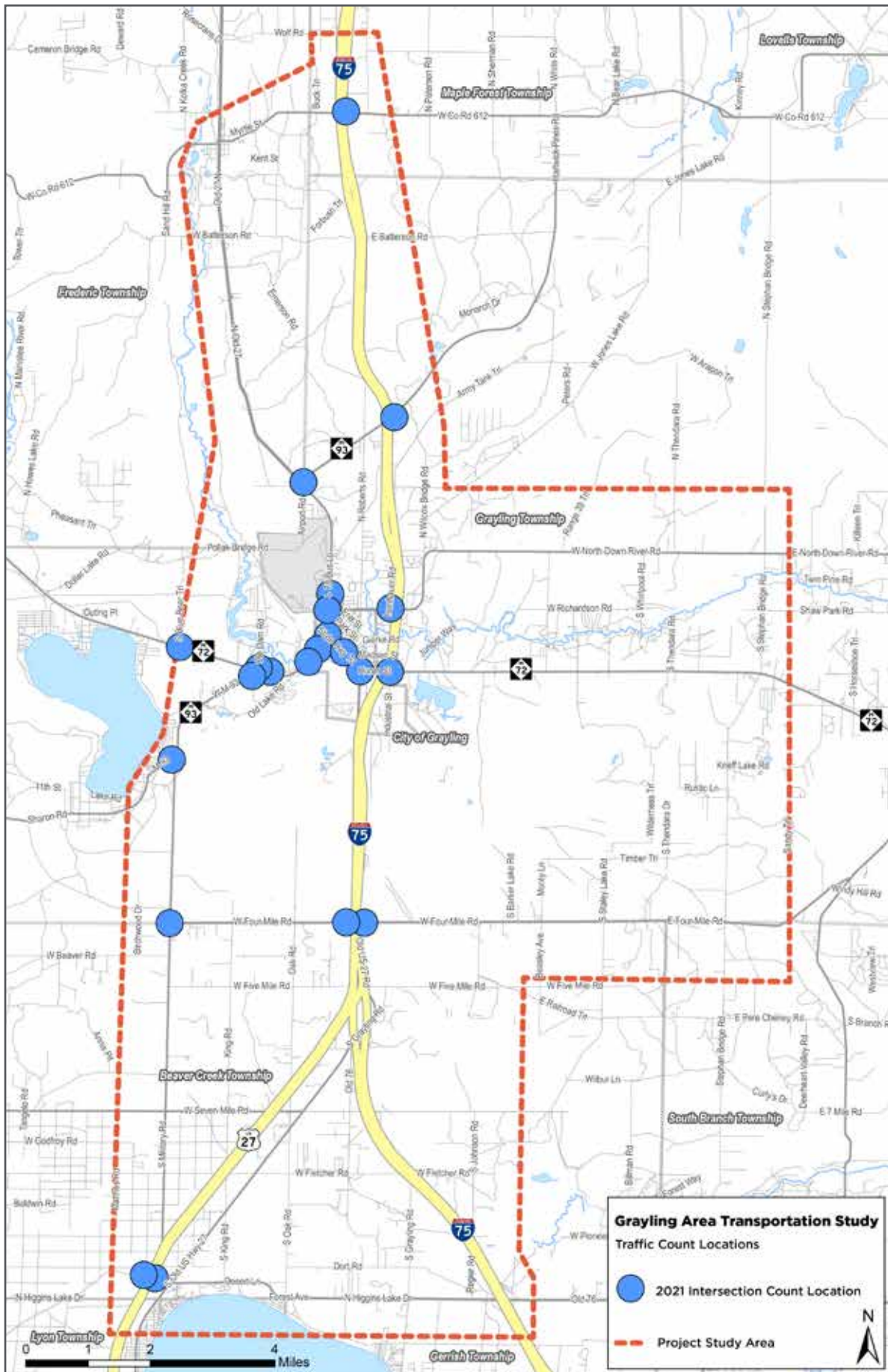


FIGURE 12: Locations 2021 of Traffic Counts

PREVIOUS PLANNING

2008 Grayling Area Transportation Study

In 2008, the precursor to this Study was completed. The goal of the study was to collect traffic volume data, examine the existing transportation and land use conditions, and, ultimately, develop a set of feasible alternatives that improve access between I-75 and the Grayling area that reduce travel time, reduce complexity of wayfinding, and promote economic vitality. The Study Area for the 2008 study is the same as this plan. Recommendations from this Study include the following:

- Add a full access interchange at I-75 and N Down River Rd.
- Update roadway geometry at N Down River Rd, M-72 East, I-75 BL, and 4 Mile Rd.
- Truck route/by-pass signage along 4 Mile Rd and Military Rd.
- Add space along M-93 overpass for a trail connection to the Hartwick Pines Trail.
- Upgrade deer crossing signs throughout the Study Area.

Camp Grayling Joint Land Use Study

Camp Grayling Joint Maneuver Training Center and the Alpena Combat Readiness Training Center completed a Joint Land Use Study to look at the ways the civilian and military life intersect and to help ensure an optimal experience for both sides. Safety for residents while ensuring the military can train soldiers and airmen is paramount, but through the suggested strategies in this plan, partnerships can be forged to help all parties thrive. Incompatible development across the study area is addressed to resolve existing and future conflicts. A number of recommendations were identified for Camp Grayling to improve land use around the facility, including:

- Creating military overlay zones around Camp Grayling
- Create a joint landscape plan with MDNR
- Conduct a noise study
- Commission a Camp Grayling Installation Master Plan
- Update the Grayling Area Transportation Study
- Initiate Camp Grayling outreach and community council
- Develop a water resources plan for Northeast Michigan
- Create a fire protection services agreement
- Conduct an economic impact study

City of Grayling Master Plan

The City of Grayling's Master Plan was completed in 2015 and identifies recommendations for land use, natural resources, transportation, and economic development needs. The transportation section identifies roadway improvements to the I-75 interchanges to allow for better access into and out of Grayling. Additionally, the City would like to update the Norway Streetscape to provide a catalyst for redevelopment. Additionally, the Master Plan recommends the following policy directives around the city:

- Construct new residential streets to be a safe width for travel, but not unnecessarily wide.
- Implement transportation management options to add to travel choices.
- Identify traffic calming measures and implement in specific areas.
- Implement access management guidelines in commercial areas.
- Require traffic impact analyses for large developments.
- Incorporate streetscape design elements into new roadway projects.

Grayling Township Master Plan

Grayling Township's Master Plan was completed in 2014 and consists mostly of land use recommendations for the Township. Few specific transportation recommendations are included in the plan. The goal of the Infrastructure and Public Services section is to "Maintain and improve the transportation systems, community facilities, and programs consistent with the community needs, and the ability to finance the improvements." The Master Plan also mentions that the Recreation Plan's proposed pathway projects are consistent with NEMCOG's Non-Motorized Transportation Plan and Investment Strategy.

NEMCOG Non-Motorized Trail Plan

The 2009 NEMCOG Non-Motorized Trail Plan identifies a number of potential trails and non-motorized corridors within the NEMCOG region and in Crawford and Roscommon Counties. Major on-road trails are identified along the state highways through the study area. A combination off-road and on-road trail would travel along Old-27 into Downtown Grayling. An off-road trail is also identified between N Down River Rd and M-72 near Headquarters Rd.

Kirtland College Event Center Expansion

Kirtland Community College opened an event center just prior to the COVID-19 pandemic starting and was hosting approximately 5,000 visitors each month. Future plans for the event center include a Field House for athletic events, including volleyball, basketball, and high school sporting events. Kirtland estimates an additional 6,000 visitors per month when the Field House opens. Additionally, the Roscommon Campus of Kirtland is closing, and those students would use the Grayling campus, adding an additional 2,000 visitors per month. Overall, an increase of potentially 13,000 trips per month is expected when the campus is complete and in-person events have fully returned.





04

Traffic Analysis

04

TRAFFIC ANALYSIS

In 2019, MDOT collected traffic data for the major roadways in the Study Area. This included state owned roadways, such as I-75, I-75 BL, US-27, M-72, and M-93, as well as larger County and Local roads such as Co Rd 612, Old 27, N Down River Rd, 4 Mile Rd, and Military Rd. The larger state-owned roads had Average Annual Daily Travel (AADT) totals of over 8,000 vehicles per day, with the largest volumes along I-75 between Four Mile Rd and the northern boundary of the Study Area. While they do not experience the highest traffic volumes in the Study Area, M-72 and I-75 BL through Downtown Grayling have high levels of traffic compared to the number of travel lanes.

Within the Study Area, non-freeway traffic volumes tend to decrease as the distance from the City of Grayling increases. M-72 however still carries a significant amount of traffic compared as this is a major route to Traverse City and other communities on the west side of Michigan.



FIGURE 13: MDOT Roadway Traffic Counts (AADT 2019)

TRAFFIC DATA COLLECTION RESULTS

Data from 22 intersections in the Grayling Area Transportation Study Area was collected in January 2021. Developing and applying a “COVID adjustment factor” was a critical aspect of the traffic data analysis. The COVID factor provides an estimate of what traffic conditions may have been in a normal year.

Impacts of COVID

COVID-19 has significantly altered the traffic conditions around the State of Michigan and around the country due to the reduced commuting and travel needs associated with working from home. The traffic counts collected in January 2021 for this Study may not be accurately representing the level of traffic volume due to lower travel rates. As part of this study, previously collected traffic data was compared to the 2021 data to determine an estimated percent change in volume. MDOT’s 2019 traffic data provided a baseline to compare the 2021 data to and is recent enough to be a reasonably close expectation of what 2020 or 2021 counts would be without COVID.

Table 8 on the following page shows comparisons of 2019 and 2021 traffic at locations in the Study Area where the MDOT traffic counts and the Transportation Study’s counts intersect. By comparing the 2019 traffic counts to the most recent traffic counts, an estimated percent change can be calculated. This change is the amount traffic has either decreased or increased between 2019 and 2021. Percent changes range from -46% to 136% based on the intersection, direction of travel, and study area zone.

Traffic counts were broken into three zones in the study

area to account for potentially different traffic patterns in the areas outside of the City of Grayling. Within each zone, two or three intersections were compared to determine an average percent change in traffic due to COVID. These intersections were those that had a direct comparison to the 2019 MDOT counts. Traffic changes for the three zones were calculated for each leg of the intersection and range -67% to +136%. The traffic changes were averaged for each zone and range from -20% to -27%.

The north and south zones experienced a larger decrease in traffic, than the central zone, at -26% and -27%. This is likely due to the concentration of essential services located in and directly adjacent to the City of Grayling. The central zone experienced a decrease of 20% from the 2019 counts, based on this date, however because of the high number of essential trips in this area, the actual decrease is likely higher. Residents from the north and south zones are still traveling into Grayling for groceries, medical appointments, school, and some jobs, but may only be making a single trip per day. Based on these observations, a standard 25% increase to account for COVID was applied to all of the intersections in the Study Area.

TABLE 8: Grayling Area COVID Adjustment Factor (2021)

Location	North Leg			East Leg			South Leg			West Leg		
	2019	2021	% Change	2019	2021	% Change	2019	2021	% Change	2019	2021	% Change
South Zone												
W. 4 Mile Rd @ S. Military Rd	1,682	988	-41%	1,285	799	-38%						
W. 4 Mile Rd @ SB I-75 on/off ramp	1,497	1,618	8%				2,230	1,026	-54%	1,285	3,033	136%
N. Higgins Lake Dr. @ US-127 SB on/off ramp	423	228	-46%	2,815	916	-67%	746	356	-52%	2,815	642	-77%
Average Traffic Change (2019 to 2021): -27%												
Central Zone												
I-75 BL @ Huron St	15,424	12,453	-19%	6,232	5,378	-14%	18,474	12,151	-34%			
Cedar St/M-93/McClellan/Lake	5,308	4,983	-6%				9,836	8,623	-12%	11,825	8,558	-28%
M-93 @ M-72				6,093	6,561	8%	2,890	1,826	-37%	8,651	5,330	-38%
Average Traffic Change (2019 to 2021): -20%												
North Zone												
N Old 27 @ Hartwick Pines Rd	1,990	1,209	-39%	5,720	3,079	-46%				1,860	2,425	30%
Hartwick Pines Rd @ I-75 NB on/off ramp	852	416	-51%	1,032	1,119	8%	365	239	-35%	1,990	920	-54%
Average Traffic Change (2019 to 2021): -26%												

Study Area Traffic Counts

The 25% COVID adjustment factor has been applied to the 2021 traffic counts to estimate what traffic conditions may have looked like in a “normal” year. The traffic counts were collected at major intersections around the Study Area, including the I-75 on and off ramps, along M-72 and M-93, and where large County roads intersect. These locations allow for a comprehensive view of the Study Area and will help

in determining where potential capacity upgrades are needed.

It is important to note that the adjusted traffic count figures are estimates based on comparisons between 2019 and 2021 traffic levels and may not represent actual traffic levels. However, it is likely that the comparative traffic levels between the various intersections remains the same.

TABLE 9: January 2021 Traffic Counts

Intersection	January 2021 Traffic Counts							
	South Leg (NB)		East Leg (WB)		North Leg (SB)		West Leg (EB)	
	Approach	Departure	Approach	Departure	Approach	Departure	Approach	Departure
W County Rd 612 @ I-75 SB on/off ramp	0	216	345	372	256	0	409	421
Hartwick Pines Rd @ I-75 NB on/off ramp	239	0	465	455	0	416	643	476
N Old 27 @ Hartwick Pines Rd	124	146	1,552	1,527	594	615	1,212	1,213
N Down River Rd @ I-75 SB off ramp	80	82	1,439	2,263	957	0	2,279	2,375
McCellan St @ N Down River Rd	2,681	2,725	1,120	1,052	2,248	2,274	116	114
McCellan St @ Grayling Army Air Field entrance	2,285	2,257	0	0	2,256	2,283	1	2
M-93 @ Walker Dr	4,247	4,322	4	11	4,348	4,256	18	28
M-93 @ Evergreen Dr	4,101	4,159	13	19	4,246	4,154	121	149
M-93 @ W Pine Point Rd	72	72	3,494	3,516	145	53	3,423	3,493
M-93 @ M-72	923	903	3,275	3,286	592	517	2,623	2,707
M-72 @ S Blue Bear Trail	0	1	2,506	2,406	9	9	2,403	2,502
M-93 @ S Military Rd	468	429	614	654	87	79	254	261
Cedar St @ Michigan Ave	4,734	5,864	2,074	1,111	4,357	4,400	552	894
M-72 @ State St	6,474	5,926	419	1,957	5,802	4,812	0	0
I-75 BL @ Huron St	6,043	6,108	2,923	2,455	5,978	6,457	152	76
Huron St @ Industrial St	678	677	1,704	1,785	28	36	2,345	2,257
W 4 Mile Rd @ NB I-75 on/off ramp	931	932	1,689	1,714	0	1,485	1,847	1,267
W 4 Mile Rd @ SB I-75 on/off ramp	0	1,026	1,265	1,845	1,618	0	1,510	1,523
W 4 Mile Rd @ S Military Rd	291	306	421	378	480	508	0	0
N Higgins Lake Dr @ US-127 SB on/off ramp	0	356	514	402	228	0	329	313
S Military Rd @ N Higgins Lake Dr	70	82	315	328	313	288	0	0

Table 9 and Table 10 below show the actual traffic counts collected in January 2021 and the COVID adjusted traffic counts. Overall, the intersections with the highest volumes are located in the center of the Study Area in and around the City of Grayling. The busiest intersections in the Study Area and the legs which carry the most volume are shown in bold in the tables. These intersections are all located along the M-72, M-93, and I-75 BL through Grayling. Other

pockets of high volume exist throughout the Study Area but are isolated and typically associated with an on or off ramp to I-75 to US-27.

TABLE 10: January 2021 Traffic Counts - COVID Adjusted

Intersection	January 2021 Traffic Counts (COVID Adjusted)							
	South Leg (NB)		East Leg (WB)		North Leg (SB)		West Leg (EB)	
	Approach	Departure	Approach	Departure	Approach	Departure	Approach	Departure
W County Rd 612 @ I-75 SB on/off ramp	0	270	431	465	320	0	511	526
Hartwick Pines Rd @ I-75 NB on/off ramp	299	0	581	569	0	520	804	595
N Old 27 @ Hartwick Pines Rd	155	183	1,940	1,909	743	769	1,515	1,516
N Down River Rd @ I-75 SB off ramp	100	103	1,799	2,829	1,196	0	2,849	2,969
McCellan St @ N Down River Rd	3,351	3,406	1,400	1,315	2,810	2,843	145	143
McCellan St @ Grayling Army Air Field entrance	2,856	2,821	0	0	2,820	2,854	1	3
M-93 @ Walker Dr	5,309	5,403	5	14	5,435	5,320	23	35
M-93 @ Evergreen Dr	5,126	5,199	16	24	5,308	5,193	151	186
M-93 @ W Pine Point Rd	90	90	4,368	4,395	181	66	4,279	4,366
M-93 @ M-72	1,154	1,129	4,094	4,108	740	646	3,279	3,384
M-72 @ S Blue Bear Trail	0	1	3,133	3,008	11	11	3,004	3,128
M-93 @ S Military Rd	585	536	768	818	109	99	318	326
Cedar St @ Michigan Ave	5,918	7,330	2,593	1,389	5,446	5,500	690	1,118
M-72 @ State St	8,093	7,408	524	2,446	7,253	6,015	0	0
I-75 BL @ Huron St	7,554	7,635	3,654	3,069	7,473	8,071	190	95
Huron St @ Industrial St	848	846	2,130	2,231	35	45	2,931	2,821
W 4 Mile Rd @ NB I-75 on/off ramp	1,164	1,165	2,111	2,143	0	1,856	2,309	1,584
W 4 Mile Rd @ SB I-75 on/off ramp	0	1,283	1,581	2,306	2,023	0	1,888	1,904
W 4 Mile Rd @ S Military Rd	364	383	526	473	600	635	0	0
N Higgins Lake Dr @ US-127 SB on/off ramp	0	445	643	503	285	0	411	391
S Military Rd @ N Higgins Lake Dr	88	103	394	410	391	360	0	0

Traffic Analysis

Figure 14 and Figure 15 below show the location and COVID adjusted traffic volumes at the intersections in the Study Area where data was collected. The figures also show the main direction of travel and volume

through the intersection. Figure 15 shows all of the intersections in the Study Area and Figure 14 shows a detailed look at the City of Grayling and nearby areas.

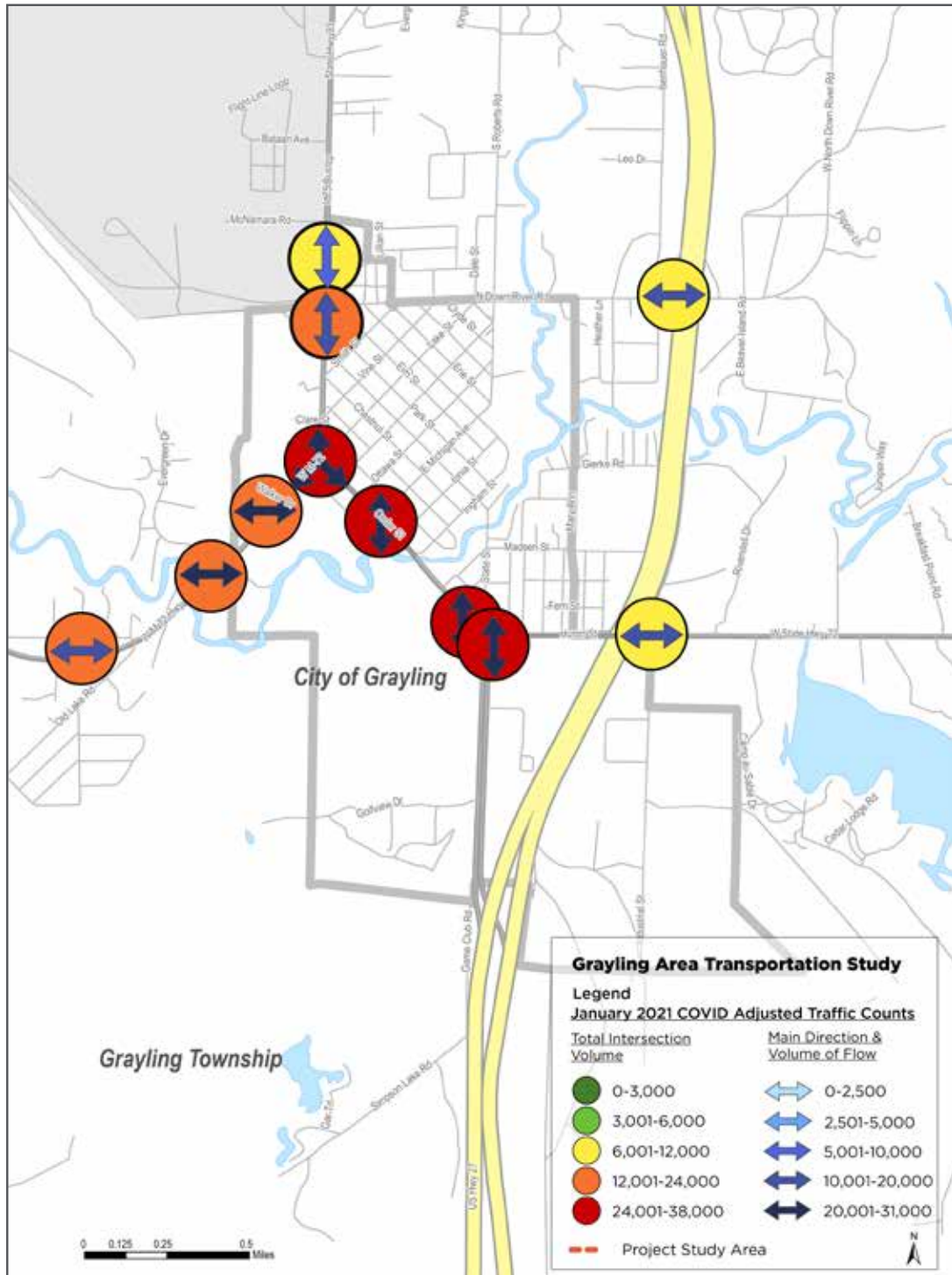


FIGURE 14: January 2021 Traffic Counts: City of Grayling

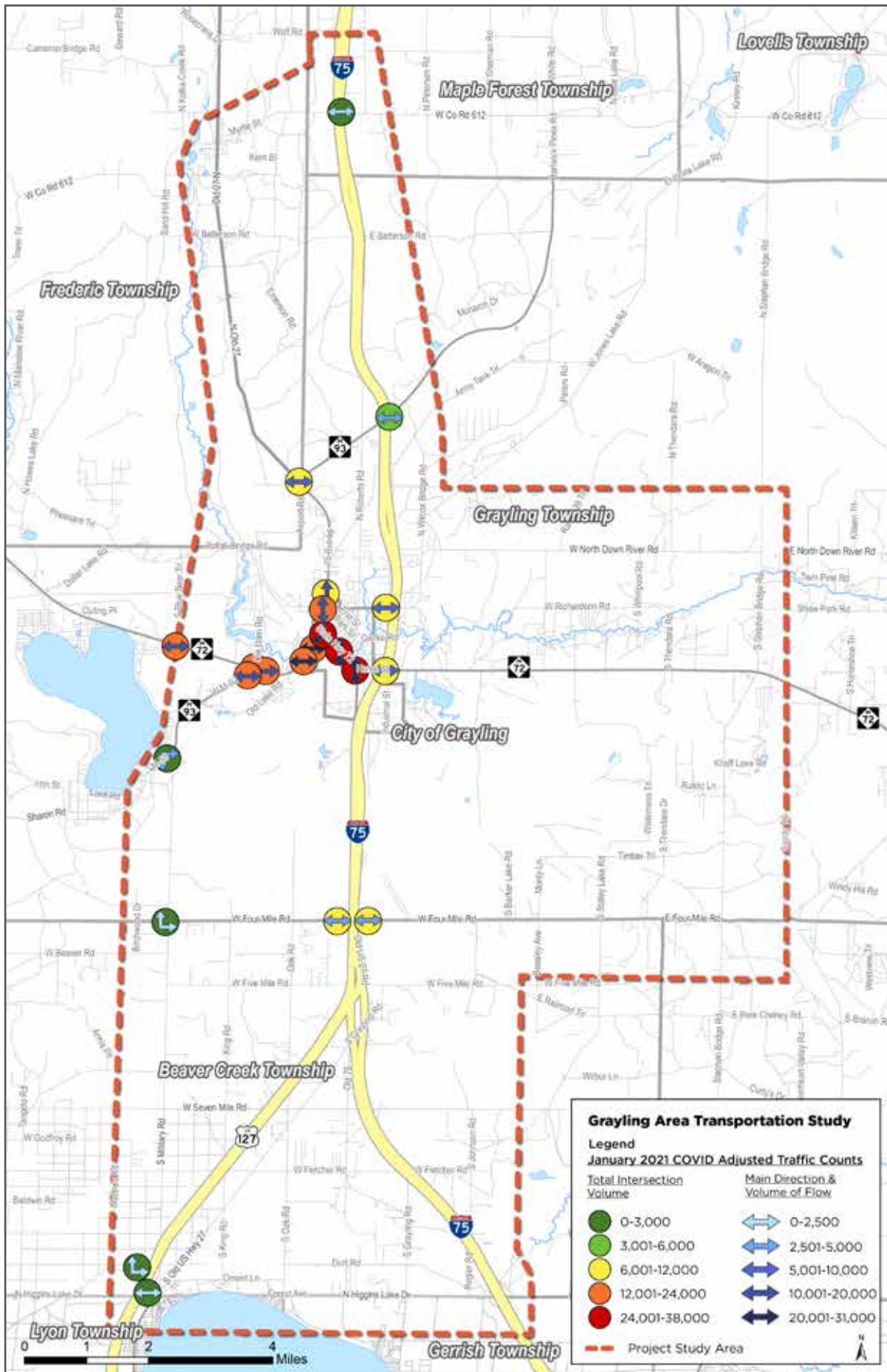


FIGURE 15: January 2021 Traffic Counts: Project Study Area

TRAFFIC LEVEL OF SERVICE ANALYSIS

The study area includes twenty-two intersections to be evaluated within Grayling, Michigan. Of the twenty-two intersections, four are signalized. The four signalized intersection in the study area are M-93 at Mc Clellan, Lake St., and Cedar St., M-72 at Ole Dam Rd., Cedar St. at Michigan Ave., and I-75 BL at Huron St.

Two models were created, one with AM Peak counts and the other with PM Peak counts. The delay and level of service of each intersection were reviewed. Intersections containing a LOS C or lower were noted and will be shown in tables below.

Traffic data was collected by Traffic Data Collection, LLC (TDC) in January of 2021. Data was collected at this location in coordination with NEMCOG. The morning peak hour generally occurs between 7:30 am and 8:30 am, and the afternoon peak hour generally occurs between 3:00 pm and 4:00 pm.

With the collection of the traffic data occurring concurrently with COVID-19 health orders, it is expected that COVID-19 related traffic patterns are reflected in the volumes. In order to analyze traffic conditions prior to COVID-19, historical data collected in 2019 was reviewed. The historic traffic data was collected by MDOT in 2019 throughout the study area that matched with a number of the 2021 count locations. The historical count data was compared to the existing traffic volume data and a correction factor was developed and applied to the traffic volumes. The correction factor was then applied to most of the study area counts to increase the counted volumes by 25%, in order for the data collected to be more representative of typical traffic volumes. In the central business zone, the COVID-19 related reduction in traffic appears to be less significant. A correction factor was used for the central zone to increase the counted volumes by 20%.

The study intersections were analyzed according to the methodologies published in the Highway Capacity Manual, 2010 edition. For this project, Synchro Version 11 software was used to conduct the analysis. This software package computes delay values based on factors such as number and type of lanes, intersection controls such as STOP signs or traffic signals, traffic volumes, pedestrian volumes, geometric characteristics, signal timing characteristics, roadway grade, speed limit, etc. This analysis determines the average delay experienced by vehicles. This value is an average across the entire peak hour. For example, vehicles arriving during the busiest portion of the peak hour or arriving in a clustered group of vehicles instead of in a random pattern could experience longer delays. On the other hand, vehicles arriving during a lighter portion of the peak hour could experience a shorter delay. The average delay is used to determine the corresponding level of service (LOS) values for each intersection movement as well as the intersection as a whole.

The LOS of an intersection is based on factors such as number and types of lanes, intersection controls such as STOP signs or traffic signals, traffic volumes, pedestrian volumes, etc. LOS is expressed as a letter grade, in a range from A through F. In this context, 'A' represents the best conditions, with very little or no average delay to vehicles. LOS 'F' is the worst of conditions, equated with very large average delays and few gaps of acceptable length. Table 11 and Table 12 identify level of service criteria for signalized and un-signalized intersections.

An intersection LOS 'D' is considered by many traffic safety professionals to be the minimum acceptable condition in an urban/suburban area. For rural areas, most highway agencies consider LOS 'C' the minimum. Given the location of the study intersections, including both rural and locations within an urbanized area, LOS 'C' was established as the goal for the rural locations and 'D' was the goal for the intersections within Grayling city limits.

TABLE 11: Level of Service and Delay for Signalized Intersections

Level of Service	Average Delay/Vehicle (seconds)	Description
A	Less than or equal to 10	Most vehicles do not stop at all. Most arrive during the green phase. Little or no delay.
B	> 10 to 20	More vehicles stop than for LOS A. Still good progression through lights. Short traffic delays.
C	> 20 to 35	Significant numbers of vehicles stop, although many pass through without stopping.
D	> 35 to 55	Many vehicles stop. Individual signal cycle failures are noticeable. Progression is intermittent.
E	> 55 to 80	Considered to be the limit of acceptable delay. Individual cycle failures are frequent and progression is poor.
F	>80	Extreme and unacceptable traffic delays.

TABLE 12: Level of Service and Delay for Unsignalized Intersections

Level of Service	Average Delay/Vehicle (seconds)	Description
A	0 to 10	Little or no delay, very low main street traffic
B	> 10 to 15	Short traffic delays, many acceptable gaps
C	> 15 to 25	Average traffic delays, frequent gaps still occur
D	> 25 to 35	Longer traffic delays, limited number of acceptable gaps
E	> 35 to 50	Very long traffic delays, very small number of acceptable gaps
F	>50	Extreme traffic delays, virtually no acceptable gaps in traffic

Traffic Analysis

The study intersections were evaluated under the existing conditions during each of the peak hour periods. Table 13 and Table 14 show the intersection LOS and corresponding delays during the AM Peak Hour. Table 15 and Table 16 show the intersection LOS and corresponding delays during the PM Peak Hour.

Under existing conditions, all of the intersections operate at an acceptable level of delay during both peak periods. There are multiple approaches at select intersections that are approaching longer delays and are operating at a LOS C or D during the peak hours.

TABLE 13: 2021 AM Level of Service for Study Area Unsignalized Intersections

	Northbound		Southbound		Eastbound		Westbound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
W County Rd 612 @ I-75 SB on/off ramp	-	-	8.5	A	0.0	A	3.0	A	2.1	A
Hartwick Pines Rd @ I-75 NB on/off ramp	10.5	B	-	-	5.3	A	0.0	A	3.9	A
N Old 27 @ Hartwick Pines Rd	8.3	A	9.0	A	10.1	B	9.9	A	9.8	A
N Down River Rd @ I-75 SB off ramp	13.5	B	10.5	B	0.0	A	0.0	A	2.7	A
McCellan St @ N Down River Rd	0.2	A	1.7	A	10.0	B	12.0	B	3.0	A
McCellan St @ Grayling Army Air Field entrance	0.0	A	0.0	A	0.0	A	-	-	0.0	A
M-93 @ Walker Dr	0.0	A	14.2	B	0.0	A	0.0	A	0.1	A
M-93 @ Evergreen Dr	0.0	A	14.3	B	0.0	A	0.0	A	0.4	A
M-93 @ W Pine Point Rd	9.4	A	9.3	A	0.1	A	0.1	A	0.2	A
M-72 @ S Blue Bear Trail	-	-	10.9	B	0.0	A	0.0	A	0.1	A
M-93 @ S Military Rd	9.1	A	9.6	A	0.0	A	1.9	A	4.8	A
M-72 @ State St	0.3	A	0.0	A	-	-	14.1	B	0.6	A
Huron St @ Industrial St	11.3	B	9.7	A	0.3	A	0.4	A	1.5	A
W 4 Mile Rd @ NB I-75 on/off ramp	11.1	B	-	-	3.8	A	0.0	A	4.0	A
W 4 Mile Rd @ SB I-75 on/off ramp	0.0	A	10.8	B	0.0	A	2.5	A	4.0	A
W 4 Mile Rd @ S Military Rd	0.0	A	5.6	A	-	-	8.8	A	3.9	A
N Higgins Lake Dr @ US-127 SB on/off ramp	-	-	8.5	A	0.0	A	3.7	A	3.0	A
S Military Rd @ N Higgins Lake Dr	0.0	A	6.4	A	-	-	8.6	A	6.7	A

TABLE 14: 2021 AM Level of Service for Study Area Signalized Intersections

	Northbound		Southbound		Eastbound		Westbound		NE Bound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Cedar St / M-93 / McCellan St / Lake St	5.5	A	14.4	B	0.0	A	17.7	B	11.7	B	10.6	B
M-93 @ M-72 / Old Dam Rd	3.5	A	6.2	A	21.6	C	18.6	B	-	-	16.7	B
Cedar St @ Michigan Ave	8.3	A	16.4	B	10.5	B	22.7	C	-	-	14.4	B
I-75 BL @ Huron St	14.4	B	10.4	B	20.8	C	9.6	A	-	-	11.9	B

TABLE 15: 2021 PM Level of Service for Study Area Unsignalized Intersections

	Northbound		Southbound		Eastbound		Westbound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
W County Rd 612 @ I-75 SB on/off ramp	-	-	8.9	A	0.0	A	1.6	A	3.2	A
Hartwick Pines Rd @ I-75 NB on/off ramp	8.8	A	-	-	2.9	A	0.0	A	3.2	A
N Old 27 @ Hartwick Pines Rd	7.8	A	8.6	A	9.8	A	8.0	A	8.9	A
N Down River Rd @ I-75 SB off ramp	12.1	B	10.2	B	0.0	A	0.1	A	1.6	A
McCellan St @ N Down River Rd	0.1	A	0.1	A	10.1	B	12.8	B	3.0	A
McCellan St @ Grayling Army Air Field entrance	0.0	A	0.0	A	0.0	A	-	-	0.0	A
M-93 @ Walker Dr	0.0	A	20.1	C	0.1	A	0.0	A	0.0	A
M-93 @ Evergreen Dr	19.8	C	10.4	B	0.1	A	0.0	A	0.1	A
M-93 @ W Pine Point Rd	10.4	B	11.5	B	0.1	A	0.2	A	0.6	A
M-72 @ S Blue Bear Trail	-	-	0.0	A	0.0	A	0.0	A	0.0	A
M-93 @ S Military Rd	8.9	A	10.2	B	0.0	A	4.6	A	4.3	A
M-72 @ State St	0.1	A	0.0	A	-	-	15.8	C	0.5	A
Huron St @ Industrial St	13.7	B	0.0	A	0.1	A	0.4	A	3.0	A
W 4 Mile Rd @ NB I-75 on/off ramp	10.9	A	-	-	2.1	A	0.0	A	2.3	A
W 4 Mile Rd @ SB I-75 on/off ramp	-	-	11.2	B	0.0	A	3.8	A	5.1	A
W 4 Mile Rd @ S Military Rd	0.0	A	4.8	A	-	-	9.1	A	5.5	A
N Higgins Lake Dr @ US-127 SB on/off ramp	-	-	9.3	A	0.0	A	2.9	A	3.5	A
S Military Rd @ N Higgins Lake Dr	0.0	A	5.8	A	-	-	8.7	A	6.8	A

TABLE 16: 2021 PM Level of Service for Study Area Signalized Intersections

	Northbound		Southbound		Eastbound		Westbound		NE Bound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Cedar St / M-93 / McCellan St / Lake St	4.8	A	21.7	C	0.0	A	27.4	C	14.9	B	14.1	B
M-93 @ M-72 / Old Dam Rd	4.7	A	6.4	A	19.1	B	21.4	C	-	-	17.2	B
Cedar St @ Michigan Ave	6.0	A	19.9	B	13.9	B	52.1	D	-	-	21.7	C
I-75 BL @ Huron St	13.5	B	11.9	B	18.7	B	18.3	B	-	-	13.8	B

Traffic Analysis

While still considered acceptable, these approaches may be a source of driver frustration and identification of these locations may help guide future improvement efforts. Intersections with these existing longer delay conditions include those highlighted in yellow and orange in Tables 13 through 16. The 2040 future

conditions were estimated using a combination of previous traffic growth figures, historic population and employment growth, and planned future development to identify an annual traffic growth rate. 0.15%, or 3% total over 20 years.

TABLE 17: 2040 AM Level of Service for Study Area Unsignalized Intersections

	Northbound		Southbound		Eastbound		Westbound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
W County Rd 612 @ I-75 SB on/off ramp	-	-	8.8	A	0.0	A	1.5	A	3.2	A
Hartwick Pines Rd @ I-75 NB on/off ramp	8.8	A	0.0	A	2.7	A	0.0	A	3.2	A
N Old 27 @ Hartwick Pines Rd	7.9	A	8.7	A	10.0	B	9.4	A	9.4	A
N Down River Rd @ I-75 SB off ramp	12.4	B	11.6	B	0.0	A	0.1	A	1.8	A
McCellan St @ N Down River Rd	0.1	A	1.1	A	10.2	B	18.8	C	4.1	A
McCellan St @ Grayling Army Air Field entrance	0.0	A	0.0	A	0.0	A	-	-	0.0	A
M-93 @ Walker Dr	0.1	A	20.8	C	0.1	A	0.0	A	0.1	A
M-93 @ Evergreen Dr	13.8	B	10.5	B	0.1	A	0.0	A	0.1	A
M-93 @ W Pine Point Rd	12.0	B	13.9	B	0.1	A	0.2	A	0.8	A
M-72 @ S Blue Bear Trail	-	-	0.0	A	0.0	A	0.0	A	0.0	A
M-93 @ S Military Rd	8.9	A	10.1	B	0.0	A	4.6	A	4.4	A
M-72 @ State St	0.0	A	0.1	A	-	-	21.7	C	0.6	A
Huron St @ Industrial St	14.0	B	0.0	A	0.1	A	0.3	A	3.0	A
W 4 Mile Rd @ NB I-75 on/off ramp	10.7	A	-	-	1.9	A	0.0	A	2.3	A
W 4 Mile Rd @ SB I-75 on/off ramp	-	-	11.0	B	0.0	A	3.6	A	5.0	A
W 4 Mile Rd @ S Military Rd	0.0	A	4.8	A	-	-	9.1	A	5.5	A
N Higgins Lake Dr @ US-127 SB on/off ramp	-	-	9.3	A	0.0	A	3.0	A	3.6	A
S Military Rd @ N Higgins Lake Dr	0.0	A	5.9	A	-	-	8.7	A	6.9	A

TABLE 18: 2040 AM Level of Service for Study Area Signalized Intersections

	Northbound		Southbound		Eastbound		Westbound		NE Bound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Cedar St / M-93 / McCellan St / Lake St	5.1	A	20.8	C	0.0	A	17.4	B	21.6	B	15.5	B
M-93 @ M-72 / Old Dam Rd	-	-	5.4	A	21.0	C	19.9	B	5.6	A	17.1	B
Cedar St @ Michigan Ave	8.5	A	16.5	B	14.8	B	23.5	C	17.0	C	14.7	B
I-75 BL @ Huron St	16.5	B	11.1	B	22.3	C	23.6	B	-	-	16.1	B

The 2040 estimates show that all of the intersections operate at an acceptable level of delay during both peak periods. There are multiple approaches at select intersections that are approaching longer delays and are operating at a LOS C or D during the peak hours. While still considered acceptable, these approaches may be a source of driver frustration and identification of these locations may help guide future improvement

efforts. Intersections with these existing longer delay conditions include those highlighted in yellow and orange in Tables 17 through 20.

TABLE 19: 2040 PM Level of Service for Study Area Unsignalized Intersections

	Northbound		Southbound		Eastbound		Westbound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
W County Rd 612 @ I-75 SB on/off ramp	-	-	8.8	A	0.0	A	1.5	A	3.2	A
Hartwick Pines Rd @ I-75 NB on/off ramp	8.8	A	0.0	A	2.7	A	0.0	A	3.2	A
N Old 27 @ Hartwick Pines Rd	7.9	A	8.7	A	10.0	B	9.4	A	9.4	A
N Down River Rd @ I-75 SB off ramp	12.4	B	11.6	B	0.0	A	0.1	A	1.8	A
McCellan St @ N Down River Rd	0.1	A	1.1	A	10.2	B	18.8	C	4.1	A
McCellan St @ Grayling Army Air Field entrance	0.0	A	0.0	A	0.0	A	-	-	0.0	A
M-93 @ Walker Dr	0.1	A	20.8	C	0.1	A	0.0	A	0.1	A
M-93 @ Evergreen Dr	13.8	B	10.5	B	0.1	A	0.0	A	0.1	A
M-93 @ W Pine Point Rd	12.0	B	13.9	B	0.1	A	0.2	A	0.8	A
M-72 @ S Blue Bear Trail	-	-	0.0	A	0.0	A	0.0	A	0.0	A
M-93 @ S Military Rd	8.9	A	10.1	B	0.0	A	4.6	A	4.4	A
M-72 @ State St	0.0	A	0.1	A	-	-	21.7	C	0.6	A
Huron St @ Industrial St	14.0	B	0.0	A	0.1	A	0.3	A	3.0	A
W 4 Mile Rd @ NB I-75 on/off ramp	10.7	A	-	-	1.9	A	0.0	A	2.3	A
W 4 Mile Rd @ SB I-75 on/off ramp	-	-	11.0	B	0.0	A	3.6	A	5.0	A
W 4 Mile Rd @ S Military Rd	0.0	A	4.8	A	-	-	9.1	A	5.5	A
N Higgins Lake Dr @ US-127 SB on/off ramp	-	-	9.3	A	0.0	A	3.0	A	3.6	A
S Military Rd @ N Higgins Lake Dr	0.0	A	5.9	A	-	-	8.7	A	6.9	A

TABLE 20: 2040 PM Level of Service for Study Area Signalized Intersections

	Northbound		Southbound		Eastbound		Westbound		NE Bound		Intersection	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Cedar St / M-93 / McCellan St / Lake St	3.3	A	27.0	C	7.9	A	27.4	C	30.9	C	20.0	B
M-93 @ M-72 / Old Dam Rd	6.3	A	6.2	A	19.9	B	20.8	C	-	-	17.5	B
Cedar St @ Michigan Ave	6.3	A	20.1	B	16.4	B	54.8	D	-	-	23.0	C
I-75 BL @ Huron St	16.6	B	12.4	B	25.7	C	27.1	C	-	-	17.3	B





05

Plan Recommendations

05

PLAN RECOMMENDATIONS

The purpose of the Grayling Area Transportation Study is to analyze the existing transportation conditions and compile the goals of the community to develop feasible projects that the project stakeholders can implement over the coming years. These projects are intended to address the existing issues, potential future problems, and to create a safer environment for all users. Some of these projects can be implemented now, while others are more complicated will require further study and dedicated funding to implement.

PROJECT IDENTIFICATION PROCESS

The projects being recommended as part of the Grayling Area Transportation Study range from highway interchanges to the addition of crosswalks. Each project is intended to serve a purpose and improve the transportation system within the Grayling Area. Identifying potential projects began with the data gathered from the existing conditions analysis and the traffic analysis results. A brainstorming session was held with members of the project team to identify where in the Study Area certain improvements were needed. Input

from the project Advisory Committee and community were also used to identify areas where improvements were needed from a convenience or economic development standpoint. Following the identification of the draft list of projects, they were presented to the Advisory Committee for a final review. Input from the Committee was used to refine the projects and add to the list of recommendations.

PROJECT TYPES

Highway Interchange Improvements

Many Grayling area residents, businesses, and visitors understand the difficulty of accessing I-75 from the City. The two main highway interchanges, at I-75 Business Loop and North Down River Road, are limited access. Meaning they provide access to and from the highway in some directions but not others. This can make accessing certain parts of the Study Area difficult depending on which way a traveler is coming or going.

The highway interchange improvements focus on specific options to add additional entrance or exit ramps to I-75 and possibilities to make accessing the highway safer. The challenge with these recommendations is that they must fit within a constrained right-of-way and will have to meet specific geometric details. These options try to minimize the amount of non-MDOT property that would need to be purchased to construct the improvements.

Roundabouts

Roundabouts are an intersection treatment that allows for the removal of a traffic signal to allow for safer and more efficient travel through an intersection. Roundabouts work particularly well at intersections with multiple legs or non-standard geometry. They are also a much safer option for intersections that have a high crash potential. The roundabouts identified for the Study Area are located at targeted intersections that experience a higher number of crashes, see higher speeds through the intersection, and have difficult turning movements.

Intersection Improvements

Intersection improvement project may vary depending on the specific perceived needs at each intersection identified. The intersections were selected based on a number of factors, including crash type and severity, existing level of service, future level of service, pedestrian safety conditions, and roadway geometry. The goal with these projects is to improve the safety and efficiency of the intersection. Projects may include, dedicated left turn lanes, curb radii changes, traffic signal modernization, and upgraded stop control.



Intersection improvements can help improve safety and efficiency for all users.



Roundabouts remove the traffic signal and allow for traffic to move continuously through an intersection.

Non-Motorized Facilities

The project recommendations surrounding non-motorized modes are intended to improve the conditions for pedestrians and cyclists in the Grayling Area. Grayling already has a trail that links the Hanson Hills Recreation Area to Hartwick Pines State Park. The planned Iron Belle Trail will also connect through the

City of Grayling and the Study Area. It is important to add connections to this route so that residents can access the trail safely and comfortably. These connections can also serve as an important economic development driver for those who may want to access other areas of the City.



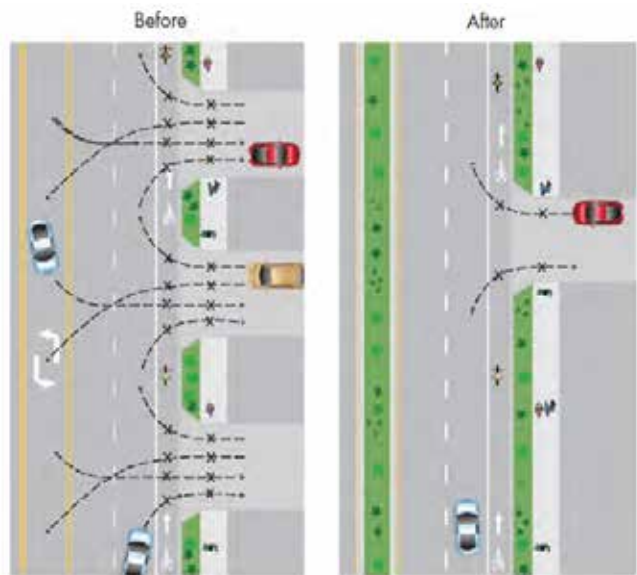
Non-motorized facilities, such as shared use pathways, allow for safe and easy travel for bikes and pedestrians.

Access Management

Access management is management of vehicle access points to land adjacent roadways. Good access management promotes safe and efficient use of the transportation network by reducing the number of potential conflict points along a roadway. There are a set of techniques that communities can use to control the locations where vehicles enter and exit property adjacent to highways, major arterials, and other roadways, including:

- Spacing between signals
- Spacing between driveways
- Dedicated turning lanes
- Median treatments
- Shared driveways
- Right-of-way preservation

The goal of access management in the context of the Grayling Study Area is to combine and eliminate redundant driveways to improve safety and traffic conditions.



Access management policies and guidelines aim to reduce potential conflicts on busy roadways.



Repaving roadways can make less used roads more comfortable for users.



On-street parking improvements, such as reverse angled parking, can improve safety in busy commercial areas.



Additional ORV trails in the Grayling Area can help maintain separation between cars and trucks and smaller ORVs.

Roadway Improvements

Roadway improvements projects are intended to improve the condition of the roadway. In the case of the Grayling Area Transportation Project these condition improvements are focused on making travel routes easier and more comfortable for travelers through specific areas. Most of these improvements are needed to better facilitate military traffic in and out of Camp Grayling.

Parking

Some parking improvements were identified for downtown Grayling to enhance safety for both drivers and non-motorized users. The improvements are focused on the on-street parking assets along Michigan Avenue and are recommended to be switched from traditional pull-in angled parking to back-in angled parking. Back-in angled parking requires a learning curve for drivers, however it is much safer when exiting the space because drivers are able to see other roadway users. The safety improvements are especially helpful for non-motorized users of the roadway.

Off Road Vehicle Trails

A goal of the Grayling Area Transportation Study is to use transportation investments to drive economic development in the region. A recent trend in outdoor adventure builds on the decades-old activity of snowmobiling. Full season off-road vehicle (ORV) trails are rising in popularity with the advent of side-by-side all terrain vehicles. Grayling already has a vast network of ORV trails that are used year-round; however, they do not connect everywhere. Adding in ORV trails that connect to major destinations can help bring more visitors to the region and assist local businesses in attracting more customers.

Recommended Projects

Through the project identification process, a variety of potential improvements to the Grayling Area Transportation System were developed. Based on the amount of traffic, existing activity centers, and current travel patterns, the majority of the identified projects are located in or near the City of Grayling. Most of the remaining projects are located along the major corridors north and south of Grayling; I-75, M-93, M-72, and US-127. Figures 16 and 17 show the location and type of each recommended project.

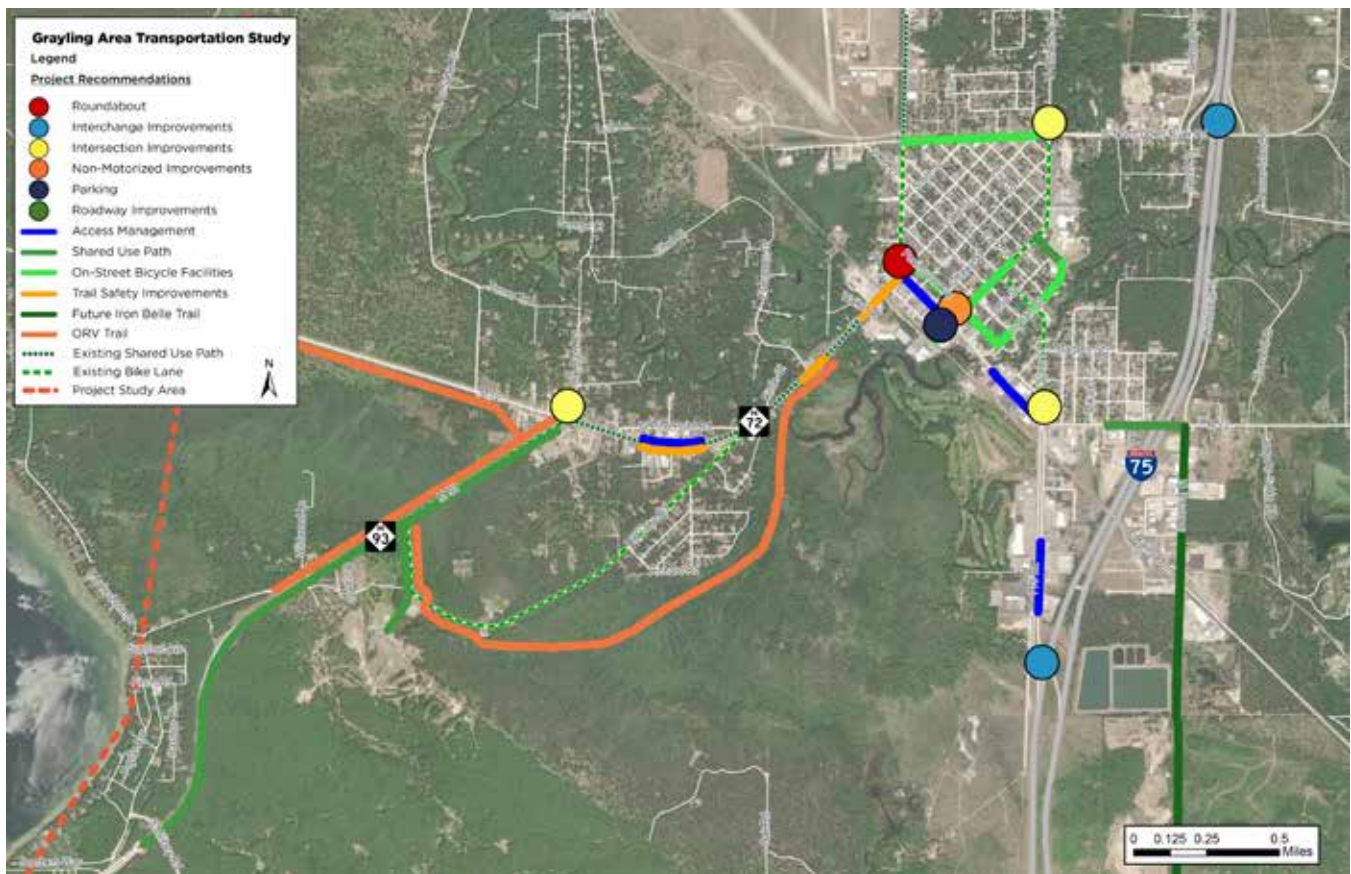


FIGURE 16: Recommended Projects Near the City of Grayling

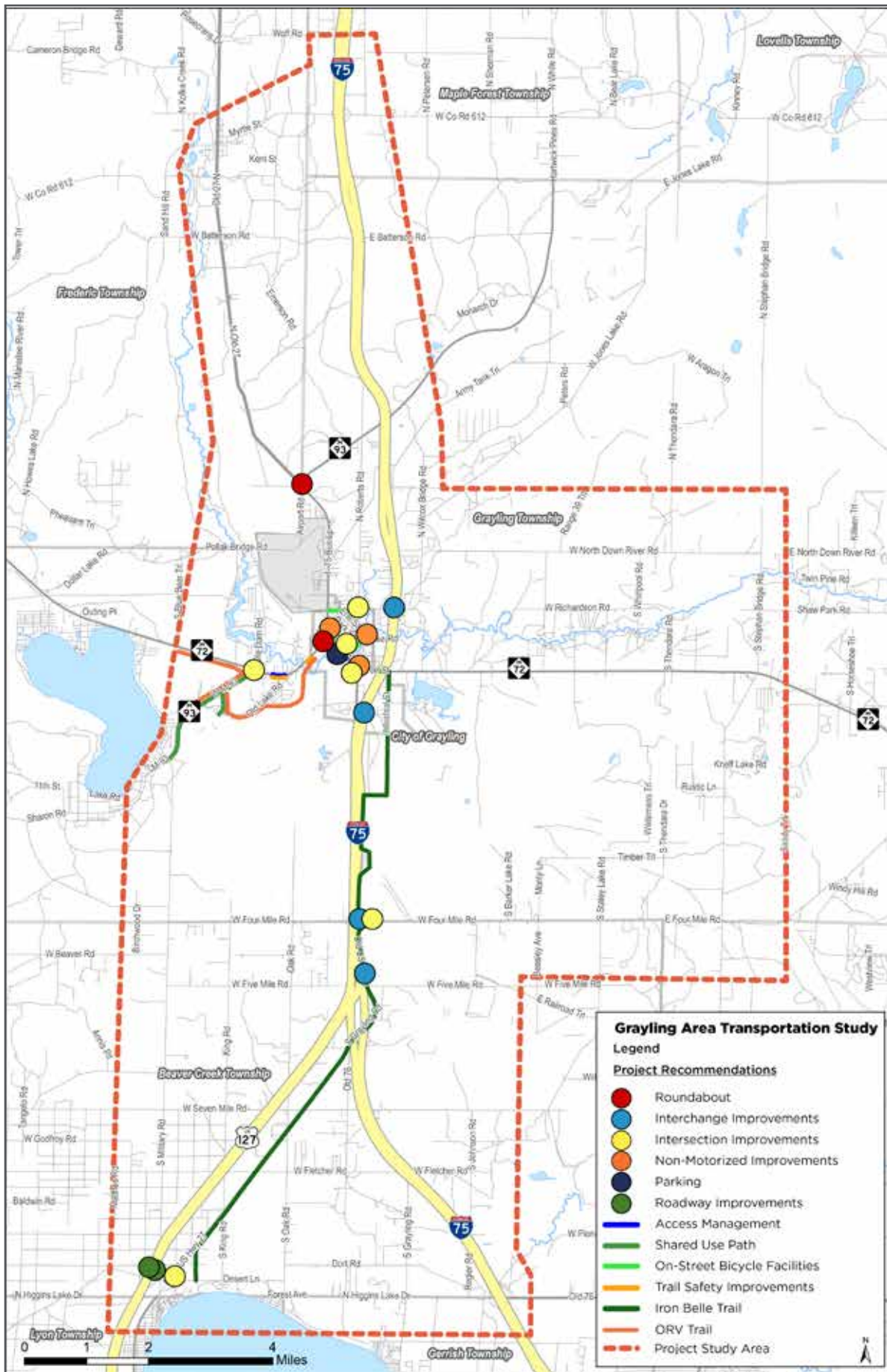


FIGURE 17: All Project Recommendations

HIGHWAY INTERCHANGE IMPROVEMENTS

Some of interchanges along I-75 and US-127 through the Grayling Study Area are lacking in access, specifically those nearest to the City of Grayling. The following two interchange improvement designs are intended to improve access from all directions and enhance safety for vehicles.



1. North Down River Road

Currently the North Down River Road interchange with I-75 consists of a southbound exit ramp and a northbound entrance ramp. The recommended concept realigns the southbound exit ramp in order to add a new southbound entrance ramp. The challenge with this interchange is adding in the southbound entrance ramp without disturbing the residential development south of North Down River Road. The homes on Glenn Road abut the I-75 southbound lanes and restrict the ability to add a traditional entrance ramp without major property takes.

To avoid taking developed property, the southbound entrance and exit ramps are realigned to a new intersection with Isenhauer Road. Much of the existing exit ramp is used and a completely new entrance ramp is added. The entrance ramp would pass under the existing overpass and merge with southbound traffic. This option would require some improvements to Isenhauer Road to direct vehicles to North Down River Road.

The new northbound exit ramp would be constructed on vacant land to the east of the northbound I-75 lanes, much of which is owned by MDOT. In order to align this ramp with the existing northbound entrance ramp, a portion of private land may need to be purchased. Figure 18 shows the location of the proposed interchange alterations at North Down River Road.

Although both of the new entrance and exit ramps require the purchasing of parcels, they do not relocate any existing structures and will have a smaller impact to the community.

Estimated Design and Construction Cost: \$15M- \$20M

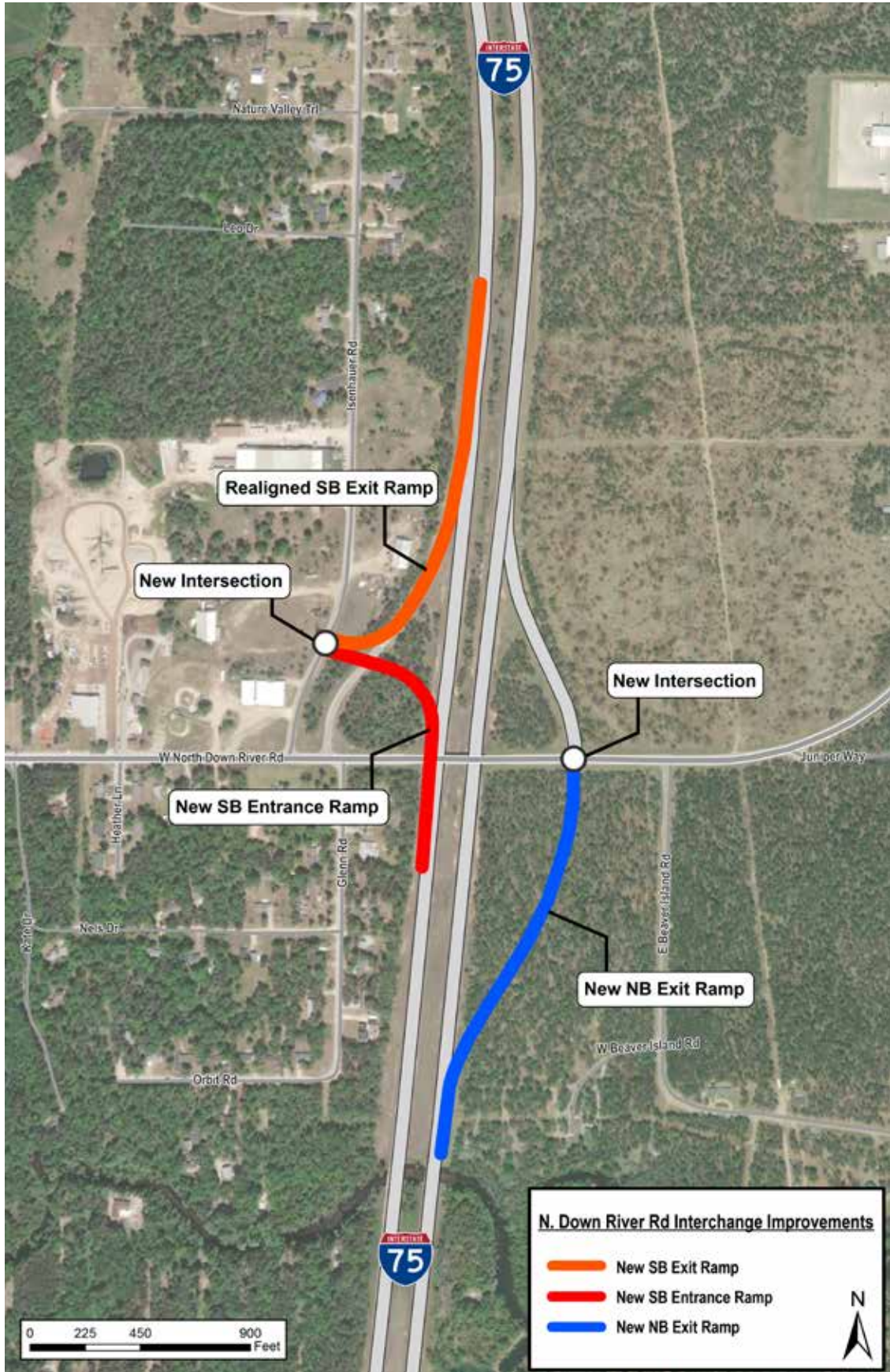


FIGURE 18: Recommended N. Down River Road Interchange Improvements

Plan Recommendations



FIGURE 19: Detailed N. Down River Road Interchange Improvements

2. I-75 Business Loop

The I-75 Business Loop interchange currently consists of a northbound exit ramp and a southbound entrance ramp. The two existing ramps connect I-75 to the I-75 Business Loop commercial district and Downtown Grayling. This interchange is typically used in conjunction with the North Down River Road interchange as they each contain the opposite ramps. The recommended improvement is to add a southbound exit ramp and northbound entrance ramp to transform this into a full interchange.

This design recommendation again focuses on adding new entrance and exit ramps to I-75, using as little additional property as possible. The parcel located where the new SB Exit Ramp is would, however, have to be acquired for the implementation of this concept. In order to achieve this, the northbound I-75 travel lanes would need to be realigned to be located closer to the southbound lanes. Currently the two sets of lanes diverge at the interchange. The addition of a new southbound exit ramp would result in a new intersection with I-75 BL.

The recommended design would keep the existing southbound entrance ramp from I-75 BL and much of the existing northbound entrance ramp and bridge. However, to align the exit ramp to the realigned I-75 mainline, a new connection would be needed. Finally, the new northbound entrance ramp would require a bridge to pass over both the southbound entrance ramp and northbound entrance ramp, before linking up with the realigned portion of I-75. Figure 15 shows the location and proposed improvements recommended for the I-75 Business Loop interchange.

Figures 20 and 21 show the recommended improvements to the I-75 Business Loop Interchange.

Estimated Design and Construction Cost: \$50M-\$60M

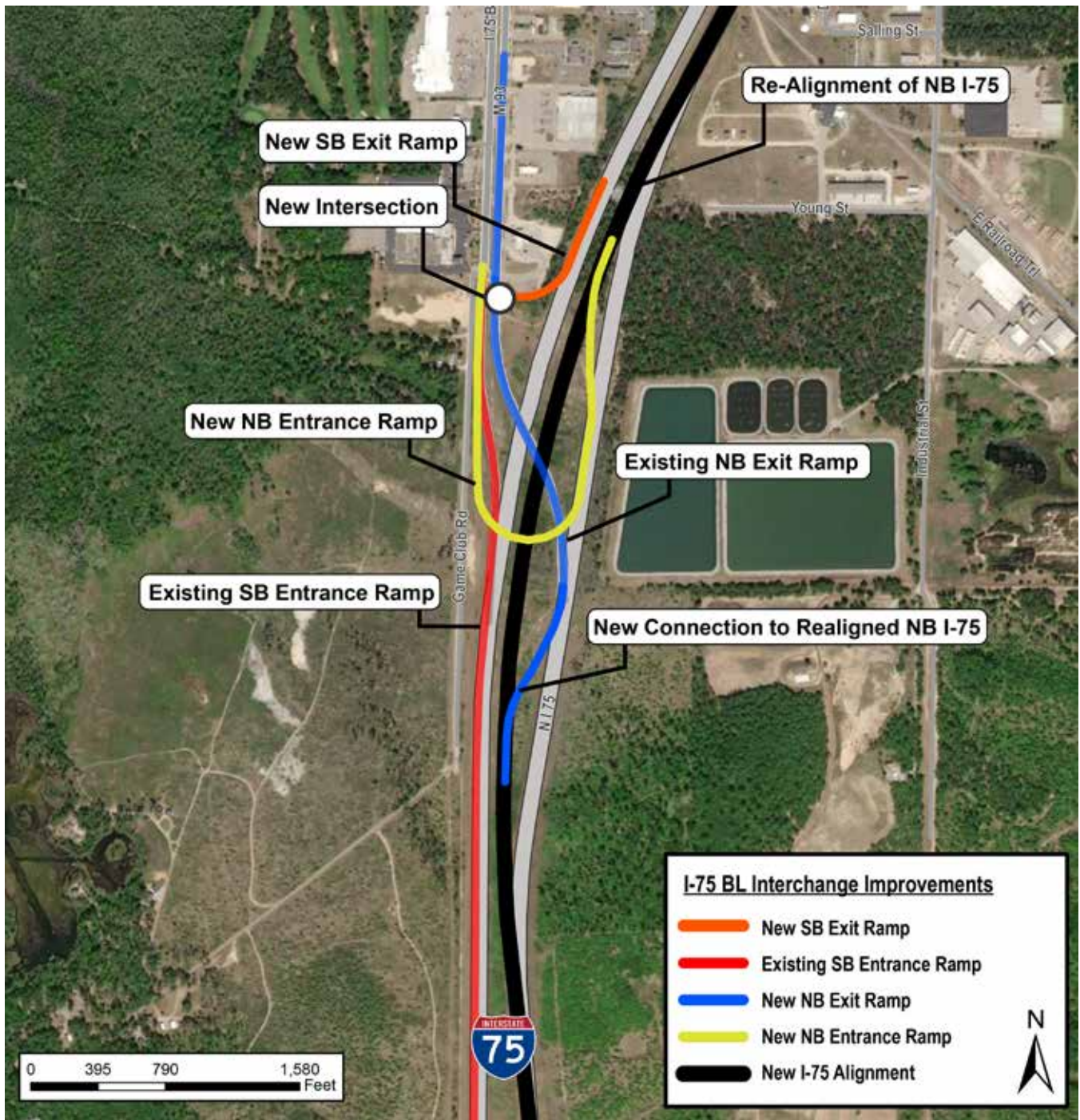


FIGURE 20: Recommended Interchange Improvements at I-75 BL

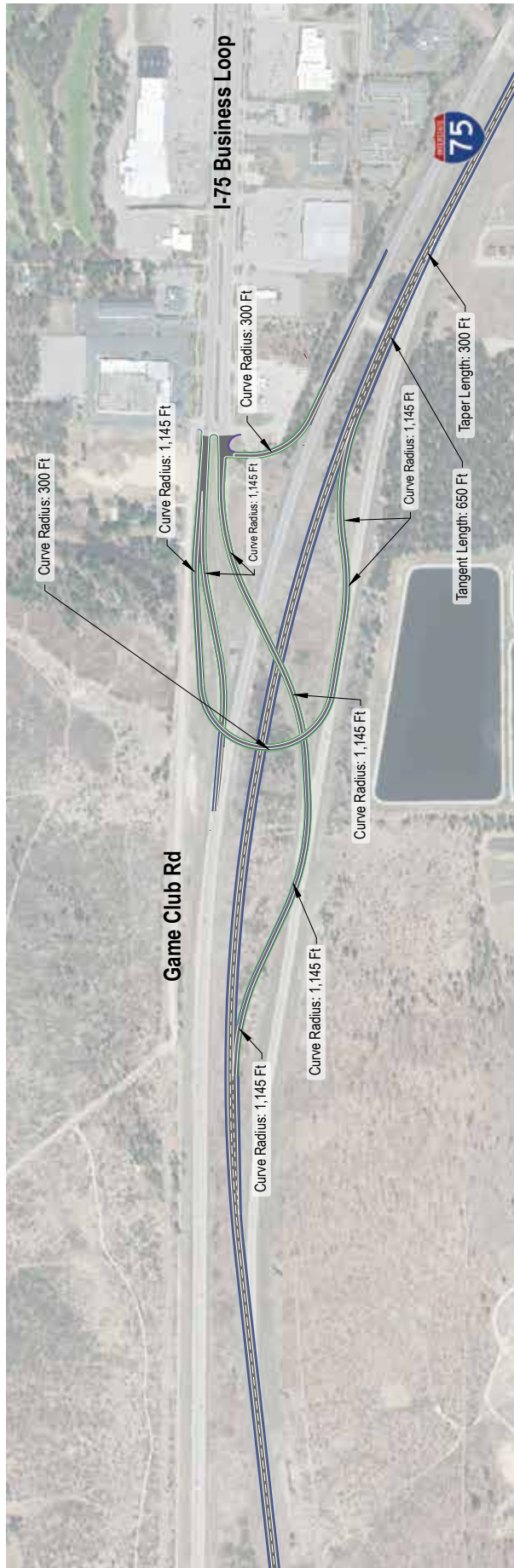


FIGURE 21: Detailed Interchange Improvement Concepts at I-75 BL

LOCAL ROADWAY IMPROVEMENT RECOMMENDATIONS

Many of the improvements to the transportation system in the Grayling Area are recommended for local and county roads that handle much of the day to day traffic in the region. The following improvements range from safety upgrades for motorists and pedestrians to congestion enhancements.

Roundabouts

3. McCellan St/Cedar St/Lake St/M-72

A roundabout is proposed for the five-way intersection located at the north end of Downtown Grayling, where M-72 and M-93 split from each other. This was one of the only intersections in the Study Area to exhibit a Level of Service lower than B and has one of the highest crash rates of any segment in the Study Area. Many residents responded in the public survey that they experience congestion and safety issues at this intersection. The existing intersection features heavy turning movements from Cedar Street to W M-72, directing travelers from I-75 to the Traverse City Area, and vice versa. Three other streets, Lake Street,

McCellan Street/M-93 and Fig Street also intersect at this intersection, making for confusing movements, especially at busy times.

A roundabout is recommended at this intersection to help improve traffic congestion and safety. Overall this roundabout concept fits mostly within the existing road right-of-way, however some additional right-of-way would be needed to fit the concept. The recommendation is to limit the amount of property taken from existing businesses, specifically the gas station at Lake Street and Cedar Street. ROW from the two empty lots at Fig and McCellan Streets and at M-72 and Cedar Street is recommended to be utilized.

Implementing a roundabout at this location should help not only motorists, but non-motorized users traveling along the Grayling Bicycle Turnpike between M-72 and Hartwick Pines State Park. This roundabout should reduce conflicts and make non-motorized travel safer.

Estimated Design and Construction Cost: \$800,000 - \$2M

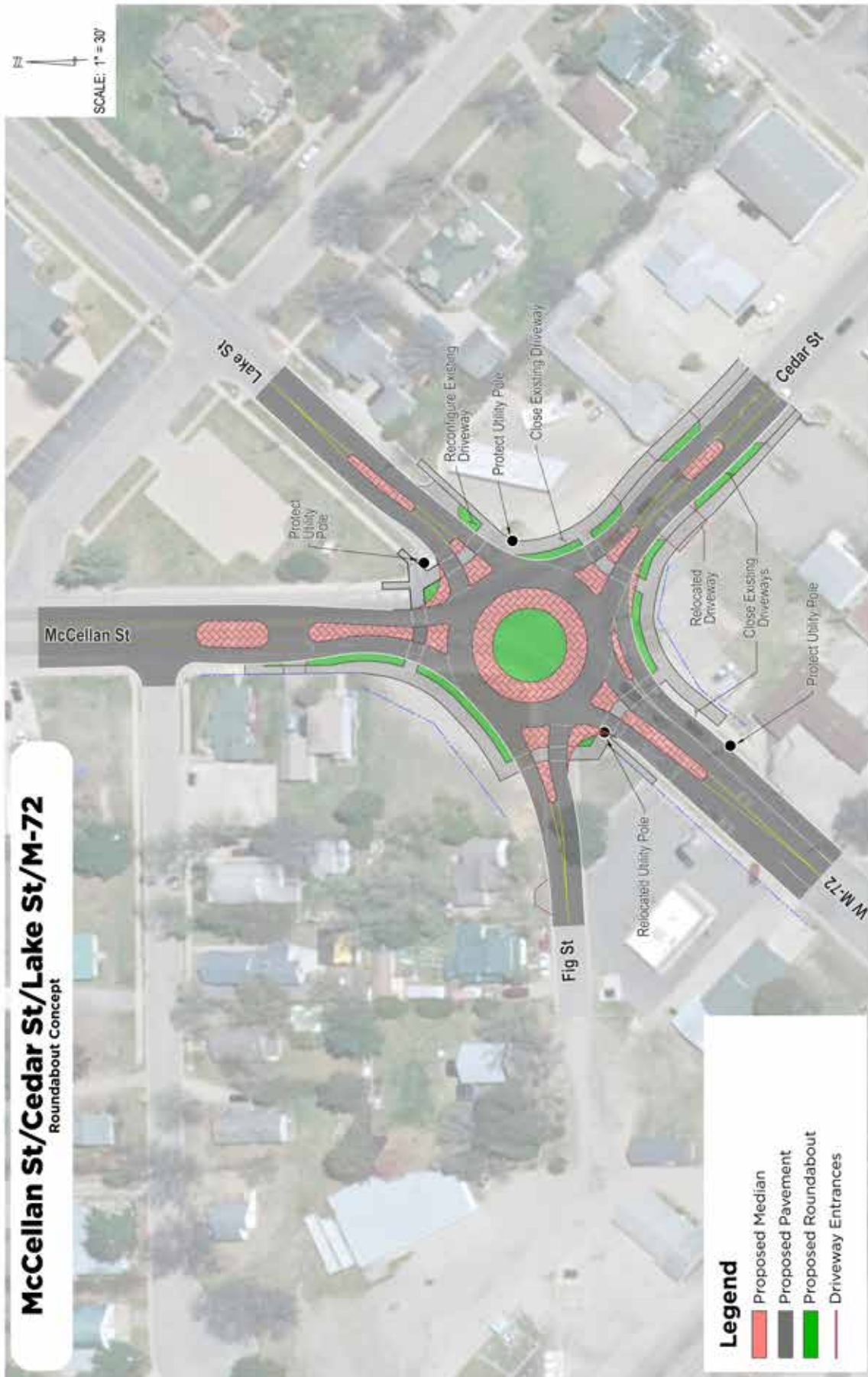


FIGURE 22: Recommended Roundabout Concept for the McCellan St/Cedar St/Lake St/ M-72 Intersection

4. Hartwick Pines Rd/N Old 27/M-93

Another roundabout is recommended for the intersection of Hartwick Pines Road, N Old 27, M-93, and Airport Road near the northern end of the project Study Area. This roundabout is in a location with three intersecting roadways and an off-road vehicle trail that splits at the intersection. The result is three different points where the ORV trail touches the intersecting roadways. This intersection is a major route for travelers coming from I-75 or Hartwick Pines State Forest into the City of Grayling from the north. It is also adjacent to Grayling High School and the Crawford County Sports Complex, both of which can see heavy traffic at various times of the day.

A roundabout at the Hartwick Pines Road/M-93/N Old 27 intersection should help improve safety conditions for both motorists and non-motorized users. The Grayling Bicycle Turnpike pathway extends through this intersection to link up with the High School and Hartwick Pines State Forest. Removing cyclists and pedestrians from this high speed intersection should improve safety and reduce the amount of crashes in this area. With improved safety here, more local non-motorized users may utilize this pathway for transportation or recreation opportunities.

Additionally, the consolidation and simplification of the existing ORV two-track trail that passes through this intersection should improve safety for snowmobilers and off-road vehicles that frequent this trail. The recommended concept moves the trail north outside of the roundabout area, giving motorists and ORVs a clear view of each other. Currently the trail passes directly through the center of the intersection, causing potentially unsafe conditions. It also lowers the number of total crossing areas to two, reducing the number of potential conflict points. This orientation is particularly helpful for snowmobilers, who tend to operate in the early evening after the sun has set in the winter. By increasing their visibility, all intersection users should feel more comfortable.

The construction of a roundabout at this intersection would require some additional right-of-way, particularly on the north side of the intersection. The State of Michigan and the Crawford Ausable School District own this land, potentially leading to an easier implementation than if the property was held by a private entity.

Estimated Design and Construction Cost: \$800,000 - \$2M



FIGURE 23: Recommended Roundabout Concept for the Hartwick Pines/N Old 27/M-93 Intersection

Benefits of Roundabouts

Roundabouts have been gaining popularity in Michigan over the past decade as transportation agencies and residents alike become more aware of their benefits. Roundabouts are shown to improve traffic flow and safety conditions at a lower cost and with improved aesthetics compared to traditional intersections. They can provide the following benefits to any transportation system:

Fewer and Less Severe Crashes

The geometry of roundabouts reduces many of the conflict points found in traditional intersections. That, coupled with slower speeds, leads to fewer crashes overall. When crashes do happen, they are less severe because vehicle speeds are much lower. Studies completed by the Insurance Institute for Highway Safety show the potential for a:

- 90% reduction in fatal crashes
- 76% reduction in injury crashes
- 40% reduction in pedestrian crashes
- 10% reduction in bicycle crashes

Higher Efficiency

At a traditional intersection, at least one direction of traffic is always stopped. However, with a roundabout, yield-at-entry traffic control eliminates stopping when not required allowing for more vehicles to move through per hour. Speeds are slower through the intersection, but the continuous movement of vehicles makes the roundabout more efficient than a similarly sized traditional intersection.

Less Vehicle Pollution

By eliminating most stop-and-go traffic through the intersection, roundabouts help eliminate idling vehicles. Idling and accelerating vehicles produce more emissions than moving vehicles.

Lower Maintenance Costs

A traffic signal requires electricity 24 hours a day and signals need ongoing maintenance by field personnel for burned out lights, loop detector replacement, and more. Most roundabouts generally only need electricity for streetlights at night and maintenance for landscaping, if included.

Enhanced Aesthetics

Standard intersections require a large paved area to accommodate all the turning movements and traffic volume. The inherent efficiency of a roundabout means that it can handle the same amount of traffic with fewer travel lanes and less pavement. Additionally, a roundabout provides opportunity to landscape the center island, providing green space within the intersection and improving the aesthetics of the area.

Pedestrian Safety Improvements

The design of a roundabout means that pedestrians only have to cross one direction of traffic at a time at each approach, as compared with two-way and all-way stop-controlled intersections. The conflict locations between vehicles and pedestrians are generally not affected by the presence of a roundabout, although vehicles come from a more defined path at a roundabout. In addition, the speeds of motorists entering and exiting a roundabout are reduced, reducing the chance of crashes and limiting the severity if crashes happen. As with other crossings that require acceptance of gaps in traffic flow, roundabouts can still present visually-impaired pedestrians with challenges in crossing.

Currently there are no roundabouts in the project Study Area, so education efforts will be needed to establish that motorists, pedestrians, cyclists, and ORV trail users understand how to safely navigate the intersection. Additionally, further study and design efforts may be needed to ensure vehicle gaps are maintained to allow for pedestrians crossing.



Roundabouts can vastly improve traffic flow and safety conditions at complicated intersections.

Local Road Improvements

5. E Michigan Avenue at North Down River Road

Stop Control Improvements

The intersection of Michigan Avenue and North Down River Road is an intersection with a higher crash rate than most in the project study area. To help reduce crashes improvements should be made to improve sight lines and make stop controls more visible. Some possible recommendations are as follows:

- Add stop bars at the Michigan Avenue legs of the intersection.
- Add flashing overhead signals to indicate Stop or Yield, depending on the intersection leg.
- Study the need for a full traffic signal.



Adding flashing sign mounted or overhead signals can alert drivers to stop.



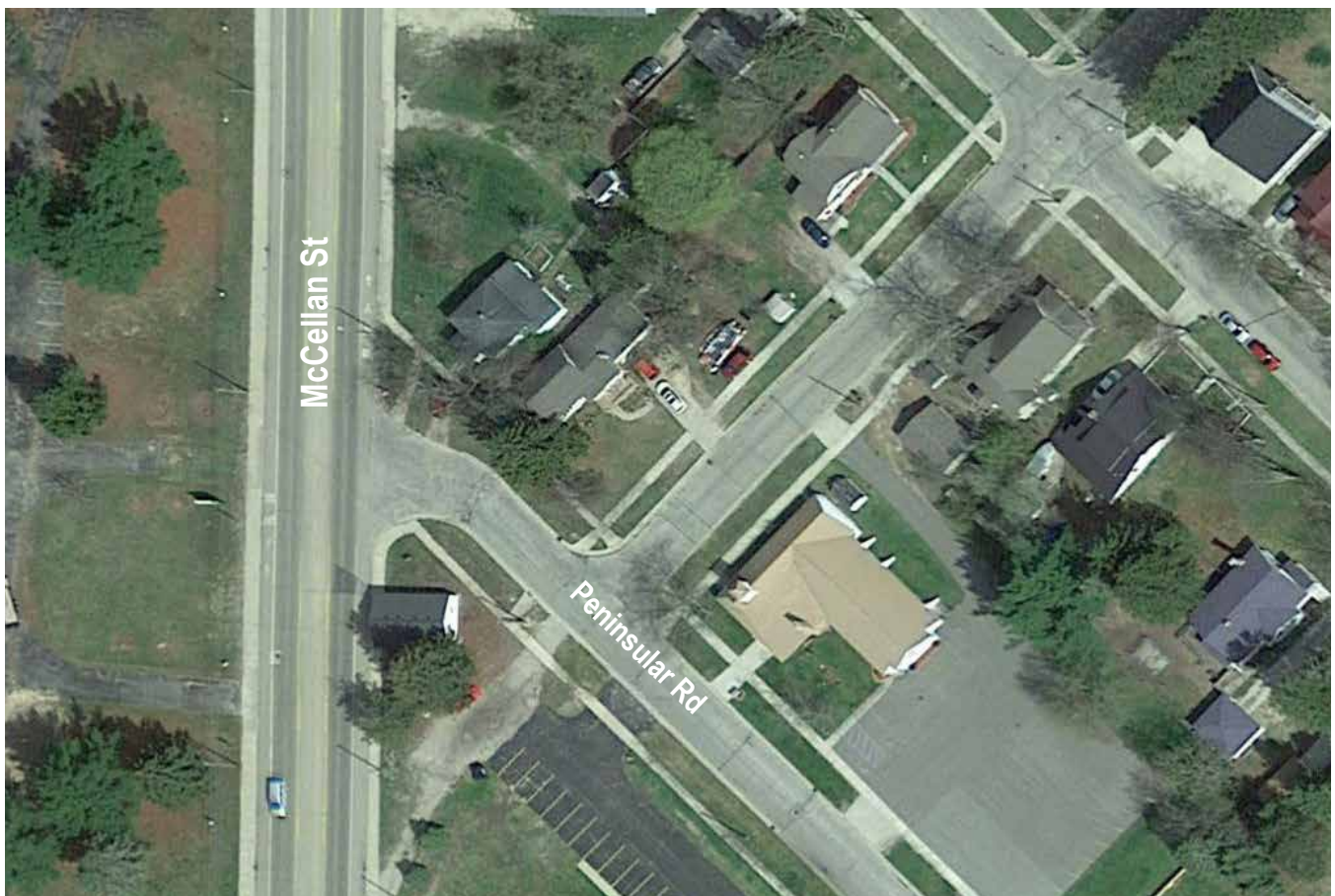
6. Peninsular Avenue at McCellan Street

Midblock Crossing

Recommended as part of the Grayling Area Transportation Study is the addition of bike lanes to Peninsular Avenue, which would connect the bike lanes on McClellan Street to the AuSable River on a lower stress street than M-72 through Downtown Grayling. In order to make the transition from the McClellan Street bike lane to Peninsular Avenue, a midblock crossing is recommended that would allow for both pedestrians and bicyclists to safely cross McClellan Street without having to backtrack.



Midblock crossings can improve pedestrian crossing safety at areas outside of a signalized or stop controlled intersection.



7. Michigan Avenue at Cedar Street

Non-Motorized Crossing Improvements

The center of Downtown Grayling sees a high volume of both vehicle and pedestrian traffic. Downtown Grayling is one of the only areas in the Study area where people visit, park their vehicles, and walk to various locations. In order to improve the safety of pedestrians and create a more walkable downtown, updates to the pedestrian crossings along Michigan Avenue are recommended. At the intersections of Spruce, Peninsular, Cedar, and Norway



Streets, high visibility crosswalks should be installed to help alert motorists that people may be crossing these streets. To improve visibility, continental, zebra, or ladder striping, brick inlays, or stamped concrete could be installed at these intersections.

Additionally, the existing traffic signal at Cedar Street and Michigan Avenue should be updated to provide safer and more convenient crossing times for pedestrians going from one side of downtown

Grayling to the other. This may mean shortening the cycles so that pedestrians can cross more frequently or lengthening one movement to allow pedestrians to cross easier.

8. Michigan Avenue from Spruce Street to Railroad

Back-In Angled Parking

Another improvement recommended for Downtown Grayling is related to on-street parking and is intended to improve safety conditions when drivers are leaving their space. Currently the parking is set up as standard angled parking where motorists drive straight into the space. It is recommended that the parking is changed to back-in angled parking, where vehicles back into the angled parking spaces. The benefit is that motorists are able to see clearly when exiting their parking space, reducing the chance of rear-ending other vehicles or hitting a cyclist or pedestrian. No loss of parking would occur with this recommendation.



High visibility crosswalks can notify motorists of the potential for pedestrian crossings.

9. I-75 BL at Huron Street and State Street

Pedestrian Crossing Infrastructure

The intersection of Huron Street, I-75 Business Loop, State Street, and M-72 is a complicated intersection with four intersecting streets at non-standard angles. Based on the traffic analysis, most of the vehicles using this intersection are continuing through from I-75 BL to M-72.

Currently most of the existing crosswalks at this intersection are standard crosswalks. This intersection exists at the southern end of the most walkable areas in Grayling and likely sees a high number of pedestrian crossings. It is recommended that “zebra crossings” or colored concrete crossings are installed here.

Additionally, there is no existing crosswalk or pedestrian signals to cross M-72 at State Street, north of Huron Street. Pedestrians looking to cross here either need to south, cross Huron Street and then cross at I-75 BL or dart across traffic at State Street. It is recommended to add crossing infrastructure (crosswalk and pedestrian signals) at the northern portion of the intersection.

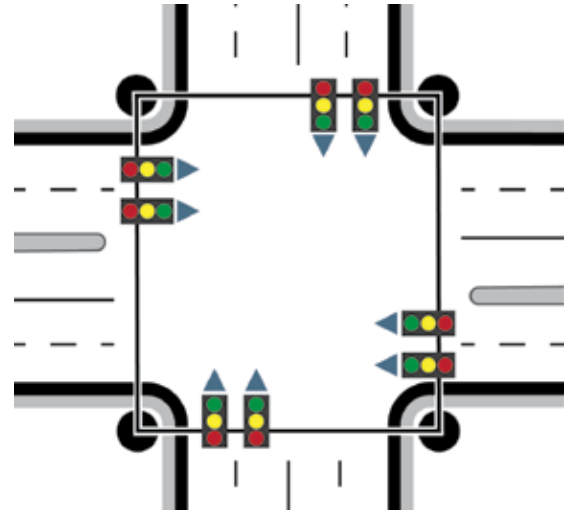


10. M-72 at M-93

Addition of Box Span Signal

The intersection of M-72 and M-93, west of Downtown Grayling currently has an outdated diagonal span traffic signal configuration. Diagonal span signals consist of two poles on opposite sides of an intersection with the signals on a wire secured between the two poles. This intersection should be updated to a box span configuration, which allow for the signals to be located near each corner of the intersection.

Advantages of this design include increased safety for maintenance workers who no longer need to be stationed in the middle of a busy intersection to make repairs, and placement of the signal head over each lane which makes it easier for drivers to see the signals.



A box span signal gives drivers a clearer view of signals



11. 4 Mile Road at Kirtland Community College

Addition of Left Turn Lane

Kirtland Community College is located just off 4 Mile Road near I-75 and has been growing over recent years. Additional traffic associated with the expansion of the College may require the addition of a center turn lane on 4 Mile Road. It is recommended that as traffic grows at Kirtland, the need for a center turn lane should be evaluated. Center turn lanes can not only reduce traffic congestion but can also improve safety by reducing the chance of rear end crashes. When slower moving or stopped vehicles can move out of the travel lane into a turn lane, passing traffic can continue with less chance of a crash.



12. N Higgins Lake Dr over US-127

Bridge Deck Repair or Replacement

The N Higgins Lake Drive over bridge of US-127 is in poor condition. Depending on the severity of the maintenance needs, this section of bridge will either need to be resurfaced at a minimum or completely replaced.

13. N Higgins Lake Dr at S. Military Road

Roadway Repair or Reconstruction

Similar to the N Higgins Lake Drive bridge adjacent to this area, this roadway is currently in very poor condition and is in need of maintenance. Depending on the severity of the maintenance needs and time since last replacement, the section of roadway from S. Military Road to US-127 will need to be resurfaced at a minimum or completely replaced. Improvements made to this section of roadway and the adjacent bridge should be made to accommodate heavy truck traffic from the military convoys leaving and entering Camp Grayling.



14. North Higgins Lake Dr at Conservation Drive

Crossing Visibility Enhancements

Currently there is a non-motorized trail crossing that connects the Civilian Conservation Corps Museum to Higgins Lake State Park. As this crossing is across a higher speed roadway, it is recommended that visibility improvements be made to ensure that motorists are aware of pedestrians and cyclists crossing here. Specific improvements include a repainted zebra crossing, speed table crossing, and/or an in street crossing sign.



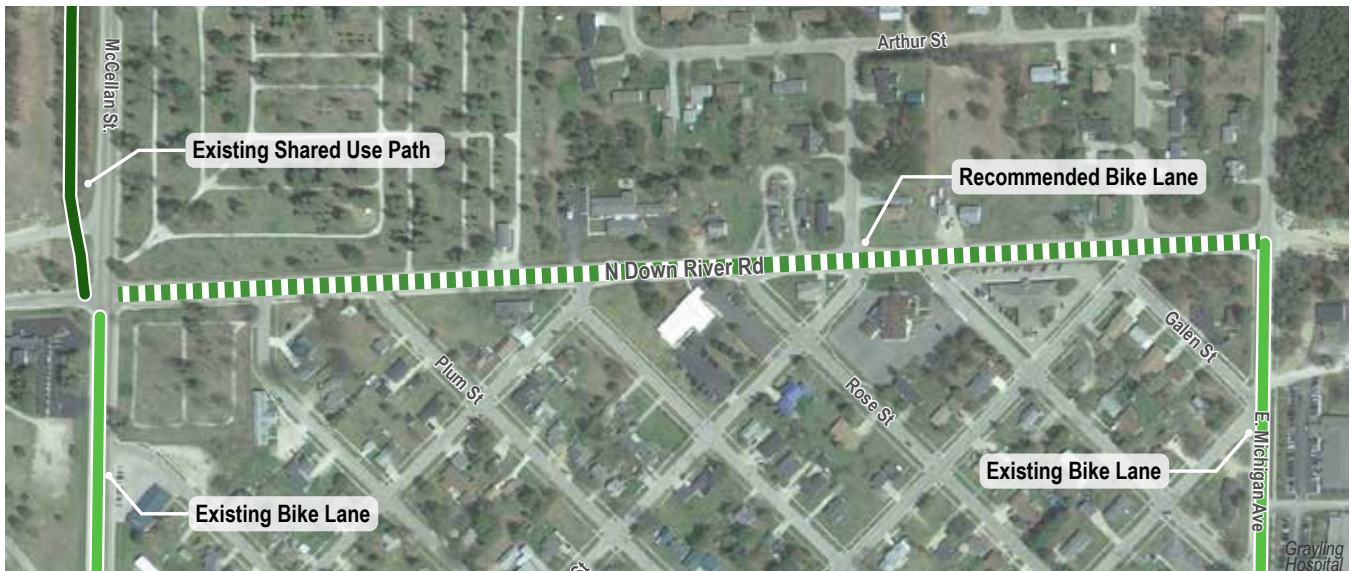
Recommendations for the trail crossing of N Higgins Lake Road should focus on maximizing visibility of non-motorized users to motorists.

NON MOTORIZED AND TRAIL IMPROVEMENTS

15. North Down River Road

Bike Lane from McCellan Street to E. Michigan Avenue

Two of the bike lanes that currently exist in Grayling are along McCellan Street and E. Michigan Avenue. N Down River Road is a link between the two and currently has enough space within the paved shoulder to be designated a bike lane. Adding a bike lane along N. Down River Road would help connect the Hospital with the shared use path that extends to Hartwick Pines State Park.



16. Peninsular Avenue

Bike Lane from McCellan Street to Ingham Street

Cedar Street/M-72 through Downtown Grayling is a busy street that carries a high amount of traffic at certain times of the day, making it a less than ideal place for bicyclists to ride. To easily allow bicyclists the ability to travel to the south end of Grayling, it is recommended that an on-street bike lane be added to Peninsular Avenue. Peninsular Avenue is a low speed, low stress street and provides a connection to Grayling Middle School.



Plum Street

17. Bike Lane from E. Michigan Avenue to Devereaux Memorial Crawford County Library

A new pathway to the AuSable River and southern part of Grayling could be connected to the existing bike lane on E. Michigan Avenue. Adding a bike lane along Plum Street would provide a safe connection for residents to the Devereaux Library and Grayling Elementary School. A bike lane is warranted as this is the main entrance for both facilities with the potential for higher traffic and a dedicated space for bikes should help reduce conflicts.

18. Shared Use Path from Plum Street to Ingham Street

19. Non-Motorized Access to Ingham Street

A continuation of the bike lane from Plum Street should be added in the form of a shared use pathway through the southern portion of the Library parking lot to Ingham Street. Ingham Street ends in a cul-de-sac and a non-motorized access point should be constructed to allow for bicyclists and pedestrians to easily travel between the residential portion of the neighborhood and the library.



20. Michigan Avenue

Sharrow Lane from Railroad to Spruce Street

Michigan Avenue through Downtown Grayling is a walkable and bikeable street and encouraging nearby residents to bike downtown can serve as an economic development generator. There is not enough space on Michigan Avenue to add a bike lane, but adding sharrow markings can help improve conditions for cyclists by making motorists aware of the potential for bikes. The sharrow lanes should connect to the existing bike lanes that end at Spruce Street.



21. Ingham Street

Bike Lane from Library to Peninsular Ave

A bike lane along Ingham Street would connect Downtown Grayling to the Devereaux Library and Grayling Elementary School when combined with the non-motorized access recommendation at the cul-de-sac. This would also help connect residents to the canoe liveries along the AuSable, potentially reducing the need for parking at these businesses.



22. Huron Street/M-72

Shared Use Path from I-75 BL/State Street to Industrial Street

The Statewide Iron Belle Trail travels through the City of Grayling and extends north and south out of town. A portion of the Iron Belle has already been completed and extends along M-93 to the intersection of Hartwick Pines Rd and Old US-27. The Southern extension is planned to run along Industrial Dr starting at Huron St. The recommended shared use path along Huron Street will connect the route through Grayling to the planned trail pathway while adding a safe and comfortable place for non-motorized users.



23. M-72/Fig Street

Shared Use Path from Cedar Street/Lake Street to Norway Street

Currently the Grayling Bicycle Turnpike, which links Hartwick Pines State Forest to Hanson Hills Recreation Area, is missing a comfortable pathway connection between the shared use path that starts at Norway St and the bike lanes that start on McCellan St. A pathway exists but it is mostly through parking lots and not well defined. Adding a paved 10 foot pathway with highly visible striping along this block should help better direct cyclists along the trail.

A safe connection from the trail to the existing bike lane should also be considered in the current configuration and for the recommended roundabout at the Cedar St/M-72 intersection.



24. M-72 at Evergreen Dr

25. M-72 at Wales Ave

Trail driveway crossing improvements

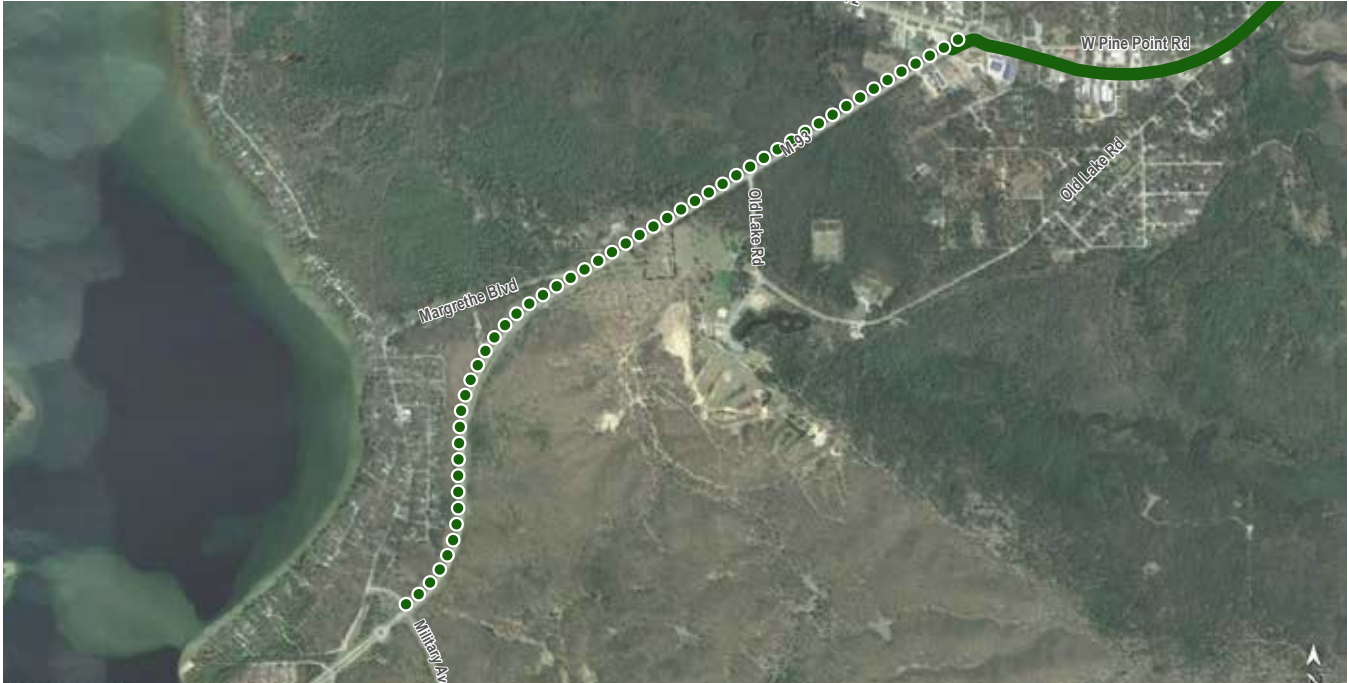
The Grayling Bicycle Turnpike shared use pathway travels along M-72 and must cross many pathways along the way. In order to improve safety conditions for cyclists and pedestrians who may be using the path, it is recommended that pavement markings and signage are added to the areas with many closely spaced driveways. Signage and pavement markings can help ensure all users are aware of each other and reduce the chance of a crash.



26. M-93

Shared Use Path from M-72 to Military Road

A bike path/paved shoulder already exists along M-93 between Military Road and M-72. To expand the usage and rider comfort of the Grayling Bicycle Turnpike, a shared use pathway should be added. This pathway would allow Camp Grayling staff and visitors to access other areas of Grayling via non-motorized means and potentially bring more employees from the base to Downtown Grayling by walking and biking. The communities along the east side of Lake Margrethe would also be able to connect to Grayling via this pathway.



27. Old Lake Road

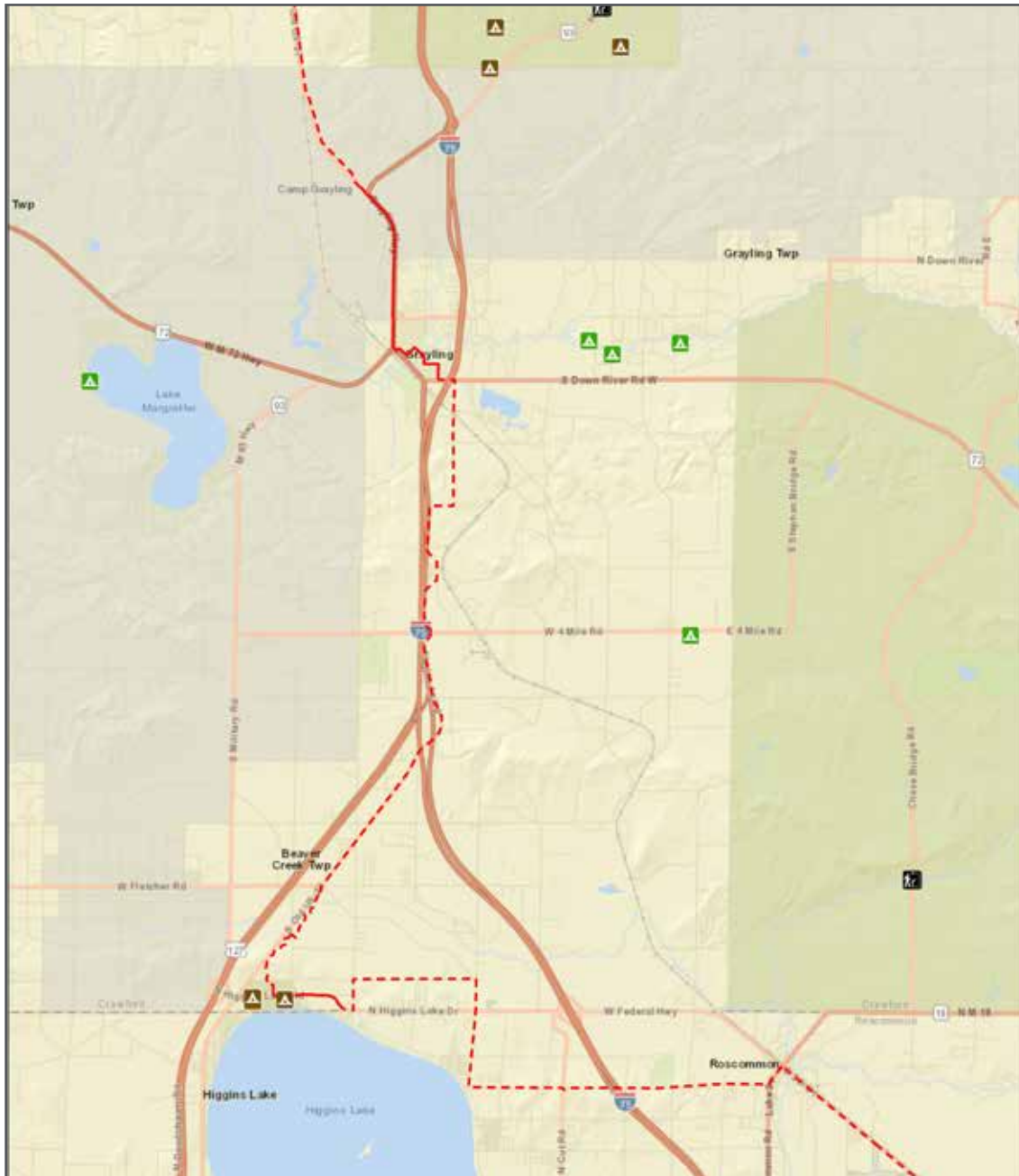
Shared Use Path from M-93 to Hanson Hills Recreation Area

A shared use path along Old Lake Road is recommended to connect Hanson Hills Recreation Area with M-93 and the previously recommended shared use path. This connection would allow visitors using the Recreation Area to access Downtown Grayling without a vehicle and would provide a safer connection from the Grayling Bicycle Turnpike.



28. Iron Belle Trail

The Statewide Iron Belle Trail is planned to pass through Grayling and connect with a portion of the existing Grayling Bicycle Turnpike trail. The northern portion would continue along N Old US 27 to Frederic and Waters, where the trail has been built and continues to Gaylord. South out of Grayling, the Iron Belle is planned to travel to North Higgins Lake State Park along Industrial Drive and S Old US 27. The non-motorized recommendations identified in this plan help to enhance this statewide amenity and help cyclists using the Iron Belle facilities reach other areas in Grayling. Local leaders should continue to work with state officials to help implement the trail.



The planned Iron Belle Trail runs directly through the Grayling Study Area. Local officials should work with MDOT in the implementation of the trail.

OFF ROAD VEHICLE TRAILS

The popularity of off road vehicles has grown in recent years with the introduction of side-by-side all terrain vehicles. These vehicles are used similarly to snowmobiles in the warmer months for exploring trails around Michigan. The Grayling Area is well known for its extensive network of off road vehicle trails that bring in many visitors from around the state. One of the goals of this plan is to identify transportation improvements that can contribute to economic development and the following recommendations are intended to better connect the existing trails to local businesses.

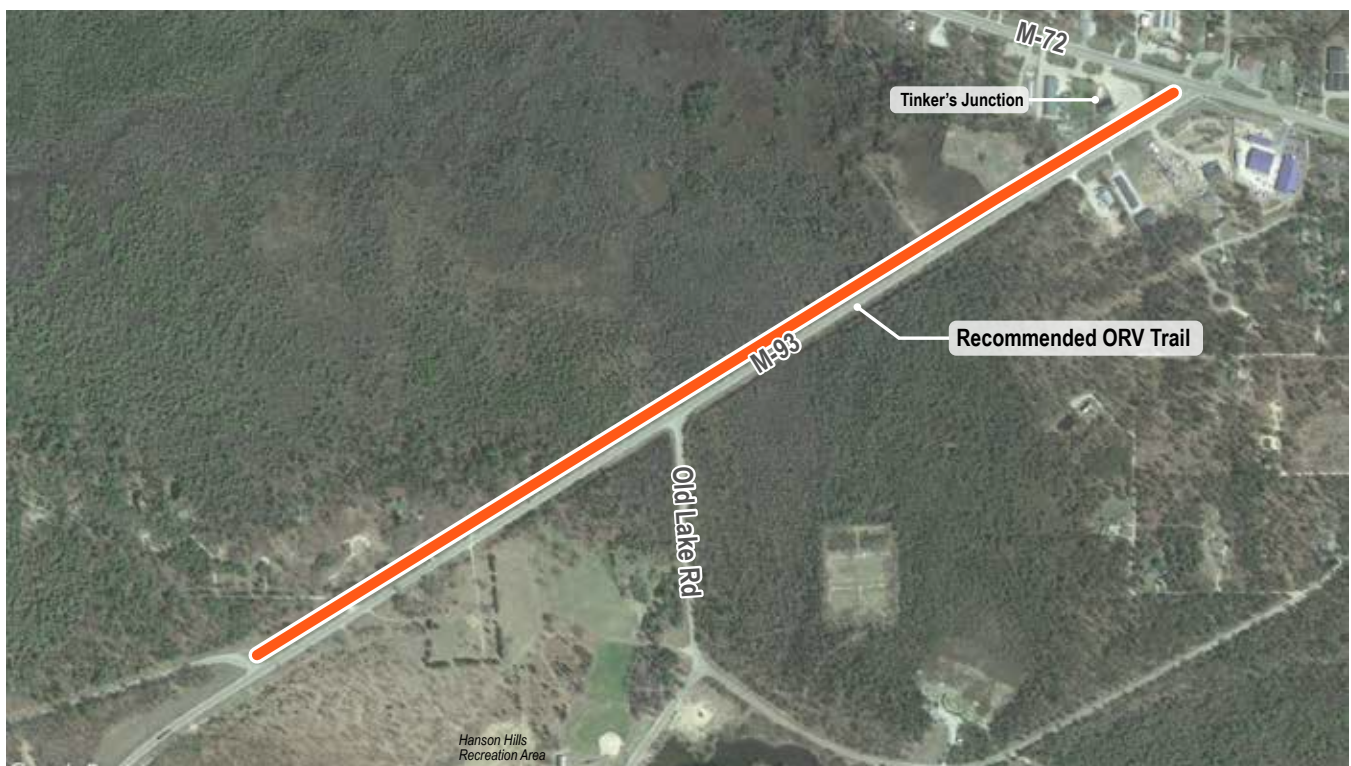
29. M-72 Connector

One of the major trails in the Grayling Area, the Frederic Trail, starts at M-72 and the project study area. The M-72 Connector route is intended to provide a safe pathway for snowmobiles and off-road vehicles (ORV) to access the businesses closer to Grayling. This ORV trail is recommended to travel on the south side of M-72 so that route to the rear of the businesses near AuSable Trail and access Tinker's Junction, a popular destination for trail users.



30. M-93 Connector

A trail connection to the residences along the west side of Lake Margrethe is recommended to allow for connections up to the commercial area at the junction of M-93 and M-72. This pathway could be implemented in a variety of ways that allow for use by both motorized and non-motorized options. The pathway parallels a recommended trail along M-93 and the two could be combined and used for cycling and running in the summer and snowshoeing and cross country skiing in the winter. Alongside the non-motorized path, a dedicated snowmobile/ORV path would provide year round connections to M-72 for motorized recreational vehicles.



31. Old Lake Road Trail

A trail connecting M-93, Hanson Hills Recreation Area, and M-72 is recommended to be added to generally parallel Old Lake Road. This trail would connect to the previously mentioned M-93 Connector trail and provide access for ORVs to Finley's Riverside Cabins and Northbound Outfitters. Finley's Cabins are another popular destination for snowmobilers and others using the nearby ORV trails. Providing access to this location would allow for safer access for these vehicles and allow them to avoid the main roadway.



32. Downtown Grayling Connector

The final link in the ORV trail network to help boost economic development in the area is a connection to Downtown Grayling. The recommended Downtown Grayling Connector would link the Old Lake Road Trail to the end of Michigan Avenue adjacent to the Crawford County Building. This would allow ORV trail users to connect to the restaurants and amenities in Downtown Grayling. This connection could also help drive traffic to Downtown businesses, especially in the winter when summer traffic is down and the region experiences fewer visitors. Coupled with this recommendation is a vehicle parking area near the train tracks. Users would be required to park here and walk to downtown businesses in order to reduce vehicle conflicts.



ACCESS MANAGEMENT

Access management is a way of improving vehicle safety and traffic congestion through efficient spacing of driveway entrances along roadways. Although the number of driveways are more limited in these areas, access to businesses, residences, or other land uses are maintained through internal circulation off of the main roadway. Good access management promotes safer and more efficient use of the transportation network by reducing potential conflict points and establishing dedicated queuing areas.

Land use and access management standards in certain areas of the Grayling Area can help maximize existing street capacity, reduce the potential for crashes, and provide easier access to adjacent land uses. Access management design regulations will specify the number, location, spacing, and design of access points to parcels.

Techniques for access management include the following:

Signal Spacing

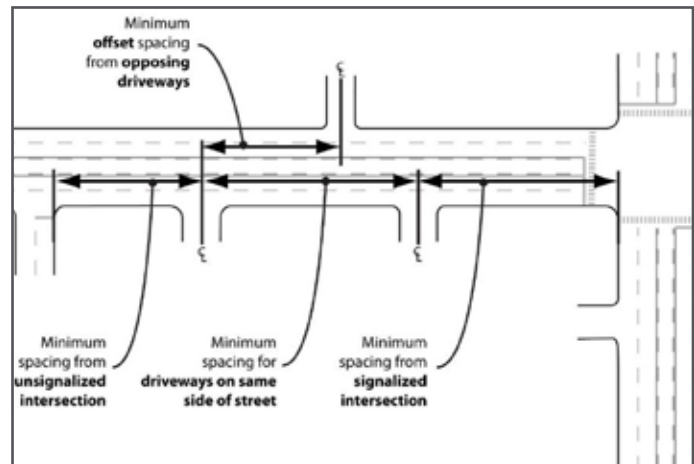
By increasing the distance between traffic signals and the flow of traffic on major arterials improves, congestion can be reduced, and air quality can improve on heavily traveled corridors.

Driveway Spacing

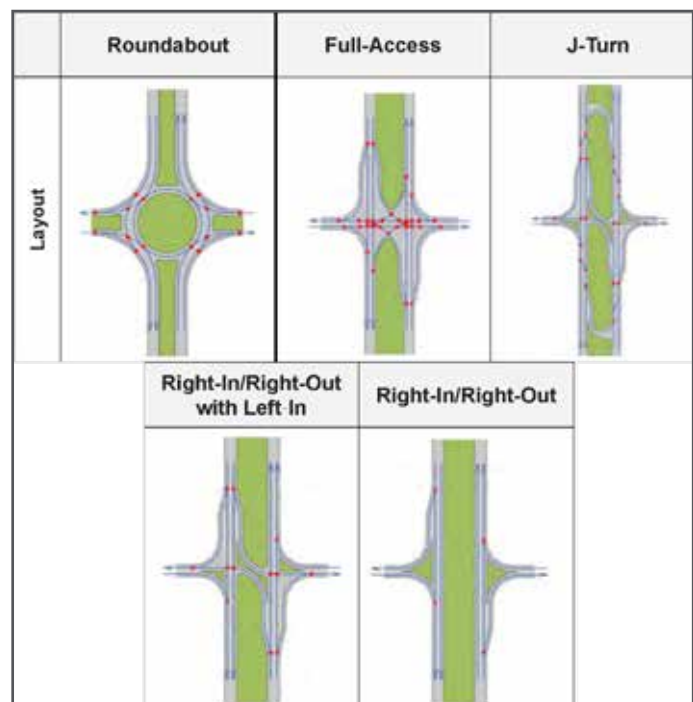
Reducing the number of driveways and maximizing their spacing allows for safer merging of traffic and presents fewer challenges to all driveway users. Motorists have clearer views of pedestrians and cyclists, both on the sidewalk and in on-street bicycle

Safe Turning Lanes

Adding dedicated left- and right-turn lanes, indirect left-turns lanes, and allowing U-turns, and roundabouts keep through-traffic flowing. Roundabouts also represent an opportunity to reduce an intersection with many conflict points to one that operates with fewer conflict points and a likelihood of less severe crashes.



Guidelines for driveway spacing for effective access management



Examples of safe turning lanes to reduce conflict points

Median Treatments

Adding two-way left-turn lanes and non-traversable, raised medians are examples of some of the most effective means to regulate access and reduce crashes. The more protected the design (medians and left turn bays) the greater reduction in crashes.

Shared Access

A technique for reducing driveways along a corridor is to consolidate access to multiple adjacent land uses through a shared access point and cross access agreements. With shared access, motorists use either connected parking areas or a frontage road to access the specific property.

Intersection Design

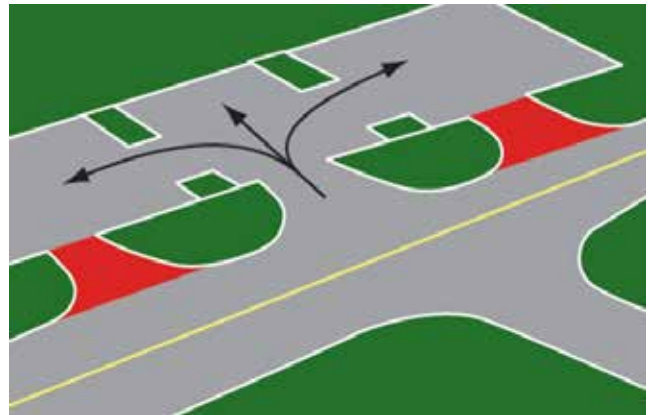
Intersections can be notorious for providing too much access from a corridor. Corner stores and gas stations are common offenders. Limiting the amount of access at an intersection through roundabouts, innovative intersection design, and/or land use policy can improve safety and limit congestion. Locating intersecting driveways either far apart or directly across from each other can also help reduce conflicts.

Land Use Planning

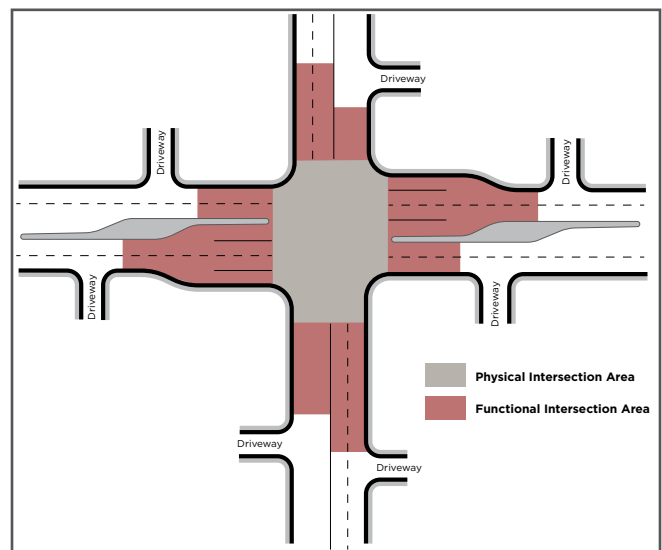
Adjacent land use zoning and corridor planning can dictate how access is controlled to the uses along a roadway. Design standards can limit driveway spacing, enforce cross access, and even retrofit corridors that have no access management standards.



Medians and dedicated left turn lanes can help reduce crashes and improve the efficiency of a street.



Consolidating driveway entrances to adjacent properties reduces conflict points.



Locating driveways outside of the 'Functional Area' (shown in red above) improves both the efficiency of the intersection and reduces the crash potential.

Access Management Recommendations

An access management program for Crawford County roadways should be developed in partnership with the local communities. A starting point is adopting a clear policy with definitive design guidelines based on the MDOT Access Management Guide. Ideally, local Zoning Ordinances should direct applicants to the County's standards. Both the county guidelines and local community regulations should have a threshold that triggers a re-evaluation with a change in use or expansion. Access permitting procedures should be evaluated with more specifications on the use and anticipated traffic approved with the permit; that a change would require a new permit or improvements to the road or access system.

Specific roadway access management plans should be developed for I-75 BL, Cedar Street, and M-72. This would include the establishment of corridor-wide frameworks for access management improvements as part of any redesign or reconstruction efforts. These plans should provide a strategy to implement access management through a combination of traffic engineering measures, local land use regulations, and close coordination among transportation and land use decision makers.

Specific components of the plan and regulations may include:

- Require additional information on the site plan or lot split, including information on existing access along and across the street, sight distance, an analysis of access options and multi-modal transportation
- Minimum lot width and lot split recommendations to ensure compliance is considered for both the existing/proposed and future access
- Minimum structure setback recommendations
- Minimum corner clearance design criteria
- Driveway design and spacing criteria
- Parking and internal circulation design criteria
- Right turn and taper design criteria
- Shared driveway provisions and possible incentives
- Provisions to accommodate transit routes;
- Provisions to support pedestrian and non-motorized travel including systems along the road, connections to building entrances, convenient bike parking
- Requirements for transportation impact studies and their review
- Signage placement
- Other provisions as identified throughout the study process
- A tight process for consideration of waivers or modifications that require approval of both the local community and county road commission





06

Implementation Plan

06

IMPLEMENTATION PLAN

IMPLEMENTATION PLAN

An implementation plan comprised of all the projects identified through the Grayling Area Transportation Study was developed to help guide NEMCOG and its project partners with adding these projects to the transportation system.

The matrix on the following pages lays out the study recommendations by project type and includes an implementation time frame for each project; Short Term, Mid Term, and Long Term. The matrix also includes a summary of the project details, limits, potential project partners, funding sources, and an estimated project cost.

The Short Term Solutions are “easier-to-implement” projects that can be addressed in the relative near term to improve traffic congestion and multi-modal travel in the Grayling Area. These solutions consist of smaller projects that are less costly to construct and do not require a long lead time in funding acquisition, design, or construction.

Mid Term Solutions are more expensive to implement, but do not require the long lead time to design and construct that a project like a highway interchange may need. These solutions consist of many of the shared use pathways, ORV trails, and larger roadway projects that will require a longer lead time on funding acquisition, design and construction, and may require the purchase some property.

The Long Term Solutions are the largest and most

expensive projects that will help improve congestion, access, and safety issues in the Grayling Area. These solutions consist of roundabouts and highway interchange redesigns and/or expansions that will require the most lead time in funding acquisition, property acquisition, design, and construction.

The implementation plan is intended to help staff with the development of projects by clearly laying out the project details, the priority to the community, and each project’s implementation needs.

The implementation plan includes high level cost estimates for each of the recommended projects. These are intended for planning purposes only and more accurate cost estimates will be developed with further design.

- **\$\$\$\$\$:** \$20M - \$60M
- **\$\$\$\$:** \$2M - \$20M
- **\$\$\$:** \$100,000 - \$2M
- **\$\$:** \$30,000 - \$100,000
- **\$:** Under \$30,000

Project Type	Project Number	Project Details	Time Frame	Road	At	Improvement Type	Project Partners	Potential Funding Source*	Cost
Highway Interchange Improvements	1	Add SB entrance ramp and NB exit ramp, reconfigure SB exit ramp	Long Term	North Down River Rd	I-75	Operations Improvement	MDOT, FHWA, Crawford Co Road Commission (CCRC), NEMCOG	DCIP, BUILD, NHS, STP, INFRA, MDOT Rural Task Force, TEDF	\$\$\$\$
	2	Add NB Entrance Ramp and SB Exit Ramp, realign NB I-75 and add SB exit ramp connection to realigned I-75	Long Term	I-75 BL	I-75	Operations Improvement	MDOT, FHWA, NEMCOG	DCIP, BUILD, NHS, STP, INFRA, MDOT Rural Task Force	\$\$\$\$\$
Local Roadway Improvements	3	Add Roundabout	Mid Term	M-72/Cedar St	McClellan St/M-93/Lake St	Traffic Safety Improvement, Operations Improvement	MDOT	DCIP, NHS, STP, MDOT Rural Task Force	\$\$\$\$
	4	Add Roundabout	Mid Term	M-93/N Old 27	Hartwick Pines Rd	Traffic Safety Improvement	MDOT	DCIP, NHS, STP, MDOT Rural Task Force	\$\$\$\$
	5	Stop Control Improvements	Short Term	E Michigan Ave	N Down River Rd	Traffic safety	CCRC, City of Grayling	STP, Local Funding	\$
	6	Add Midblock Crossing	Short Term	Peninsular Ave	McClellan St	Non-motorized safety	City of Grayling	STP, TAP, Highway Safety Improvement Program (HSIP), Local Funding	\$\$
	7a	Add High Visibility crosswalks	Short Term	Michigan Ave	Cedar St	Non-motorized safety	City of Grayling, MDOT	STP, TAP, HSIP, Local Funding	\$
	7b	Review/Update Signal Timing	Short Term	Michigan Ave	Cedar St	Non-motorized safety	City of Grayling, MDOT	STP, Local Funding	\$
	8	Back-In Angled Parking	Mid Term	Michigan Ave	Penninsular Ave	Non-motorized safety, traffic safety	City of Grayling	Local Funding	\$
	9	Add High Visibility crosswalks	Short Term	I-75 BL	Huron St/ State St	Non-motorized safety	MDOT	STP, TAP, HSIP, Local Funding	\$

Implementation Plan

Project Type		Project Details	Time Frame	Road	At	Improvement Type	Project Partners	Potential Funding Source*	Cost
Local Roadway Improvements	10	Upgrade to Box Span Signal	Mid Term	M-72	M-93	Traffic Safety Improvement	MDOT	STP, Local Funding, MDOT Rural Task Force	\$\$
	11	Add Center Turn Lane	Mid Term	4 Mile Rd	Kirtland College Entrance	Traffic safety improvement	CCRC	STP, Local Funding	\$\$
	12	Repair or Replace Bridge Deck	Short Term	N Higgins Lake Rd	US-127	Roadway maintenance	MDOT, CCRC	HBRRP, STP, MDOT Local Bridge Program	\$\$\$\$
	13	Resurface or Replace Roadway	Short Term	N Higgins Lake Rd	S Military Rd	Roadway maintenance	CCRC, MDOT	STP, MDOT Rural Task Force	\$\$\$
	14	Add Trail Crossing Visibility Enhancements	Mid Term	N Higgins Lake Rd	Conservation Dr	Non-motorized safety	MDNR, Roscommon County Road Commission	TAP, HSIP	\$
Non-Motorized and Trail Improvements	15	Add Bike Lane	Mid Term	N Down River Rd	McCellan St to E Michigan Ave	Bicycle Network Improvement	City of Grayling, NEMCOG	TAP, STP, local road funding	\$
	16	Add Bike Lane	Short Term	Peninsular Ave	McCellan St to Ingham St	Bicycle Network Improvement	City of Grayling, NEMCOG	TAP, STP, local funding	\$
	17	Add Bike Lane	Mid Term	Plum St	E Michigan Ave to Devereaux Library	Bicycle Network Improvement	City of Grayling, NEMCOG	TAP, SRTS, local funding	\$
	18	Add Shared Use Path	Long Term	Plum St	Devereaux Library to Ingham St	Non-motorized Network Improvement	City of Grayling, NEMCOG	TAP, SRTS, local funding	\$\$
	19	Add Non-Motorized Access	Short Term	Plum St	Ingham St	Non-motorized Network Improvement	City of Grayling, NEMCOG	TAP, SRTS, road funding	\$\$
	20	Add Sharrow Lane	Short Term	Michigan Ave	Railroad to Spruce St	Bicycle Network Improvement	City of Grayling, NEMCOG	TAP, STP, local funding	\$
	21	Add Bike Lane	Short Term	Ingham St	Peninsular Ave to Ingham St	Bicycle Network Improvement	City of Grayling, NEMCOG	TAP, STP, local funding	\$
	22	Add Shared Use Path	Mid Term	Huron St/M-72 E	I-75 BL to Industrial St	Non-motorized Network Improvement	MDOT, City of Grayling, MDNR, NEMCOG	TAP, STP, local funding	\$\$
	23	Add Shared Use Path	Short Term	M-72 W	Cedar St to Norway St	Non-motorized Network Improvement	MDOT, City of Grayling	TAP, STP, local funding	\$\$

Project Type		Project Details	Time Frame	Road	At	Improvement Type	Project Partners	Potential Funding Source*	Cost
Non-Motorized and Trail Improvements	24	Add Driveway Crossing Enhancements	Short Term	M-72 W	Evergreen Dr	Non-motorized Network Improvement	MDOT, NEMCOG	TAP, STP, local funding	\$
	25	Add Driveway Crossing Enhancements	Short Term	M-72 W	Wales Ave	Non-motorized Network Improvement	MDOT, NEMCOG	TAP, STP, local funding	\$
	26	Add Shared Use Path	Long Term	M-93	M-72 to Military Rd	Non-motorized Network Improvement	MDOT, NEMCOG	TAP, STP, Land & Water Conservation fund, Natural Resources Trust Fund local funding	\$\$\$
	27	Add Shared Use Path	Long Term	Old Lake Rd	M-93 to Hanson Hills Rec Area	Non-motorized Network Improvement	Grayling Township	TAP, STP, Land & Water Conservation fund, Natural Resources Trust Fund, local funding	\$\$\$
	28	Support Iron Belle Trail Implementation	Long Term	Grayling Study Area	Throughout Grayling Area	Non-motorized Network Improvement	MDNR, Crawford County, NEMCOG	TAP, STP, Land & Water Conservation fund, Natural Resources Trust Fund, local funding	\$\$\$\$

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Project Type	Project Number	Project Details	Time Frame	Road	At	Improvement Type	Project Partners	Potential Funding Source*	Cost
Off Road Vehicle Trails	29	Add ORV Trail	Mid Term	M-72	Frederic Trail to M-72	ORV Trail Network Enhancement	Grayling Township, MDNR	ORV/ Snowmobile Imp. Fund, Land/Water Conservation Fund, Rec Passport, TRAILS fund	\$\$\$
	30	Add ORV Trail	Long Term	M-93	M-72 to Military Rd	ORV Trail Network Enhancement	Grayling Township, MDNR	ORV/ Snowmobile Imp. Fund, Land/Water Conservation Fund, Rec Passport, TRAILS fund	\$\$\$
	31	Add ORV Trail	Long Term	Old Lake Rd	M-93 to Finley's Cabins	ORV Trail Network Enhancement	Grayling Township, MDNR	ORV/ Snowmobile Imp. Fund, Land/Water Conservation Fund, Rec Passport, TRAILS fund	\$\$\$
	32	Add ORV Trail	Long Term	M-72	Finley's Cabins to Downtown Grayling	ORV Trail Network Enhancement	Grayling Township, City of Grayling, MDNR	ORV/ Snowmobile Imp. Fund, Land/Water Conservation Fund, Rec Passport, TRAILS fund	\$\$\$
Access Management	33	Access Management	Short Term	M-72/ Cedar St	Ingham St to Michigan Ave	Traffic Safety Improvement, Operations Improvement	City of Grayling, Crawford County, MDOT	Local funding	\$
	34	Access Management	Short Term	M-72	State St to Ingham St	Traffic Safety Improvement, Operations Improvement	City of Grayling, Crawford County, MDOT	Local funding	\$
	35	Access Management	Mid Term	I-75 BL	Huron St to Game Club Rd	Traffic Safety Improvement, Operations Improvement	City of Grayling, Crawford County, MDOT	Local funding	\$
	36	Access Management	Mid Term	M-72	W Pine Point Rd to Viking Way	Traffic Safety Improvement, Operations Improvement	Grayling Township, Crawford County, MDOT	Local funding	\$

Implementation Next Steps

The Grayling Area Transportation Study serves as a roadmap for the next decade, or more, of transportation investments in the region. By identifying priority projects for the region, partners can start to work toward addressing the major issues with the system and securing funding for implementation. The next phase of work will include various levels of more detailed study, depending on the size and location of the project.

For smaller projects located on local roads and with smaller implementation costs, there are fewer regulatory hoops to jump through. For many of the projects recommended through this study, such as bike lanes, sidewalks, shared use pathways, and other vehicle safety improvements, a Categorical Exclusion will likely be issued eliminating the need for the implementing agency to conduct an Environmental Assessment.

For larger projects, such as the recommended roundabout, a Categorical Exclusion could be issued depending on the surrounding environmental and cultural resources at the site. If there is a potential to impact nearby environmental resources, an Environmental Assessment may be required prior to construction.

Finally, for the largest projects recommended as part of the Grayling Area Transportation Study, the interchange upgrades, an Interstate Access Justification Report will be needed to provide the justification and documentation to substantiate any proposed changes to the Interstate System. FHWA will review this report prior to allowing new access points to I-75, as is recommended. Following the Interstate Access Justification Report, both interchange improvements would be subject to the NEPA process and require at least the completion of an Environmental Assessment. If larger impacts are expected, an Environmental Impact Study would be required prior to implementation. Both the Environmental Assessment and Environmental Impact Statement would include detailed project level construction costs as part of the design work required for the studies.

Environmental impact analyses can take a long time depending on the potential for environmental impacts and the support of the local community. Project partners should act sooner rather than later if the recommended interstate changes are highly desired.

FUNDING SOURCES

A number of funding sources are currently available that could be applied to the Short Term, Mid Term, and Long Term Solutions identified as part of the Grayling Area Transportation Study. Some funding sources are only applicable to specific projects. For example, the Transportation Alternatives Program (TAP) aims to improve walking, biking, and transit options. Additionally, the MDOT Local Bridge Program can be used to replace, rehabilitate, and maintain bridges in the State.

The recently authorized Federal transportation infrastructure spending bill on 2021 includes a reauthorization of the Surface Transportation Act and includes additional funding for projects around the Country. NEMCOG and other agencies in the Study Area should be aware of the funding opportunities from this new bill to implement recommended projects.

Below is a list of potential funding options that MDOT, Crawford County, NEMCOG, or any of the local communities could explore when implementing the Recommended Solutions. The larger and more expensive projects will likely require a longer lead time to apply and be approved for one of the larger federal grants that would be needed.

Finally, the highest priority projects for the community should be identified as soon as possible to allow for the design time needed to capture the available funding. Projects that are “shovel ready” and have been planned and designed are more likely to receive funding from State and Federal grant sources.

FEDERAL AID OPPORTUNITIES

- BUILD (Better Utilizing Investments to Leverage Development) Grants
 - » TIGER grant replacement to be used for innovative capital project. Up to \$1.5 billion available.
- National Highway System (NHS)
 - » Federal aid highway program supporting the construction, maintenance, and operations of the nation’s highway network.
- Surface Transportation Program (STP)
 - » Flexible funding to be used to maintain or improve transportation conditions.
- Transportation Alternatives Program (TAP)
 - » Funding for activities that enhance alternative transportation options.
- Highway Bridge Replacement and Rehabilitation Program (HBRRP)
 - » Funding to rehab or replace bridges over highways and topographical barriers.
- Highway Safety Improvement Program (HSIP)
 - » Funding to be used to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land.

UNITED STATES DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION

- This Federal agency provides grants for Public Works projects throughout the U.S.

UNITED STATES DEPARTMENT OF DEFENSE
- DEFENSE COMMUNITY INFRASTRUCTURE
PROGRAM (DCIP)

- Funding designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life.

INFRA (INFRASTRUCTURE FOR
REBUILDING AMERICA) GRANTS

- Dedicated and discretionary funding source for projects that address critical issues facing our nation's highways and bridges

MICHIGAN DEPARTMENT OF
TRANSPORTATION/STATE OF MICHIGAN
OPPORTUNITIES

- Michigan State Infrastructure Bank Loan
 - » Program to help meet urgent financing demands for all Act 51 public entities
- MDOT Rural Task Force
 - » Federal dollars provided to rural counties for both road and transit capital projects
- MDOT Local Bridge Program
 - » Program to replace, maintain, and rehab locally owned bridges

MICHIGAN DNR GRANT FUNDING

- Land and Water Conservation Fund
 - » Matching grants to states and local governments for the acquisition and development of public outdoor recreation areas and facilities.
- Recreation Passport Grants
 - » Funding to local governments for renovations to existing facilities that have

outlived their useful life.

- DNR Natural Resources Trust Fund
 - » Funding to provide for natural resource protection and outdoor recreation.
- ORV and Snowmobile Trail Improvement Programs
 - » Funding for maintenance and development of ORV and snowmobiles in the statewide trail system.

TRANSPORTATION ECONOMIC
DEVELOPMENT FUND (TEDF)

- TEDF Category A: Economic Development Road Projects
 - » Goal to promote increased economic development through transportation projects by opening up areas for growth or redevelopment
- TEDF Category F: Urban Areas in Rural Counties
 - » Provides funding for projects that increase access to the State all-season road system in rural counties

SAFE ROUTES TO SCHOOLS (SRTS)

- Approach that promotes walking and bicycling to school through infrastructure improvements, enforcement, tools, safety education, and incentives to encourage walking and bicycling to school.

LOCAL FUNDING (COUNTY, CITY,
TOWNSHIP)

- In the absence of all other funding opportunities, local funding can be used to implement projects.
- Inter-jurisdictional agreements are needed
- Agencies should look to collaborate on paying for items based on need